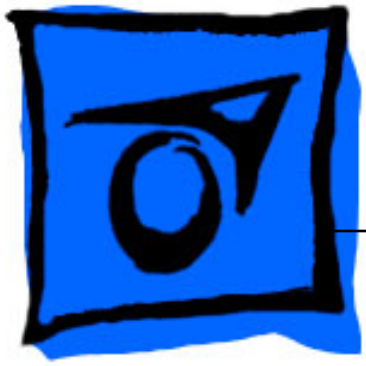
Service Source



Power Mac G5 (Late 2004)

Updated: 8 March 2005

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Service Source

Basics

Power Mac G5 (Late 2004)

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Overview

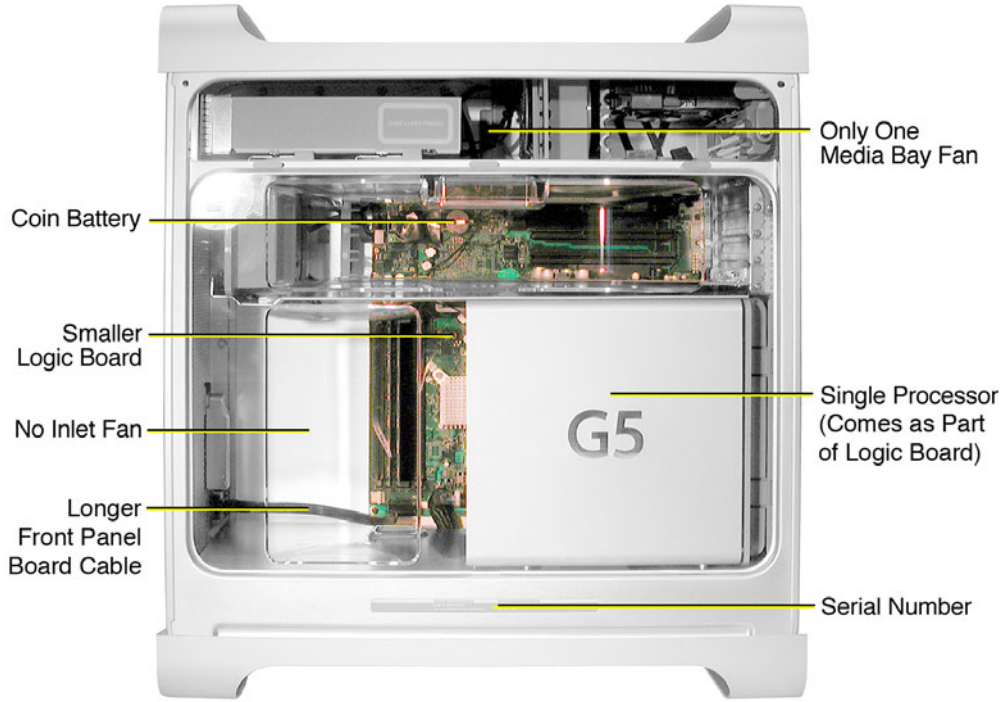
Power Mac G5 (Late 2004) is a single-processor 1.8 GHz Power Mac G5 computer that complements the existing family of dual 2.5 GHz, dual 2.0 GHz, and dual 1.8 GHz Power Mac G5 models.

Like the other Power Mac G5 models, the Power Mac G5 (Late 2004) computer is powered by the a 64-bit PowerPC G5 processor. It features 6.4GB per second of fast memory bandwidth, up to 4 GB of total main memory, three PCI expansion slots, up to 500 GB of internal Serial ATA mass storage, and AGP 8X Pro graphics capabilities.

Identification

To identify a particular model of Power Mac G5, check the computer's serial number, which lists the model's configuration. The serial number is located directly below the air deflector inside the side access panel.

The Power Mac G5 (Late 2004) computer is also distinguised from earlier Power Mac G5 models by the physical differences noted in the graphic below.



What's New

Overview

Microprocessor: The Power Mac G5 (Late 2004) computer has a single 1.8 GHz PowerPC G5 processor.

Processor system bus: The processor interface system bus runs at one-third the speed of the system processor.

Memory bus: The main memory bus is 128 bit 400 MHz.

System management unit: Power Mac G5 (Late 2004) uses an advanced system management unit (SMU) to manage thermal and wattage conditions, while keeping acoustic noise to a minimum. The SMU replaces the PMU of previous Power Mac G5 models.

DDR SDRAM: The computer has four DIMM slots for 184 pin DIMMs (dual inline memory modules) using unbuffered DDR (double data rate) SDRAM 64-bit, 400 MHz (PC3200) devices for a maximum of 4 GB.

Graphics card: The computer comes standard with the Nvidia GeForce Fx 5200 Ultra with 64 MB RAM. Available as configure-to-order (CTO) options are the ATI Radeon 9800 XT with 256 MB RAM, the ATI Radeon 9600 XT with 128 MB RAM, the Nvidia GeForce 6800 GT DDL with 256 MB RAM, and the Nvidia GeForce 6800 Ultra DDL with 256 MB RAM.

PCI expansion slots: The computer includes three 64-bit, 33 MHz PCI slots. PCI-X cards are not supported.

Hard drives: An internal 7200 rpm Serial ATA (SATA) hard drive occupies one of two drive bays and functions as the default boot drive. A second SATA drive is available as a CTO option. Power Mac G5 (Late 2004) comes standard with an 80 GB SATA hard drive, and 160 GB and 250 GB SATA drives are available as CTO options.

PowerPC G5 Processor

The processor used in the Power Mac G5 (Late 2004) has the following features:

- Single 1.8 GHZ processor
- 64-bit PowerPC implementation with 42-bit physical memory addressing
- Core runs at three times the bus speed
- Superscalar execution core supporting more than 200 in-flight instructions
- Two independent double-precision floating point units
- Velocity Engine: 128-bit-wide vector execution unit
- 64K L1 instruction cache, 32K L1 data cache per processor
- Built-in 512 KB backside L2 cache per processor
- Two independent, unidirectional 600 MHz frontside buses supporting 4.8 GBps data throughput

System Management Unit (SMU)

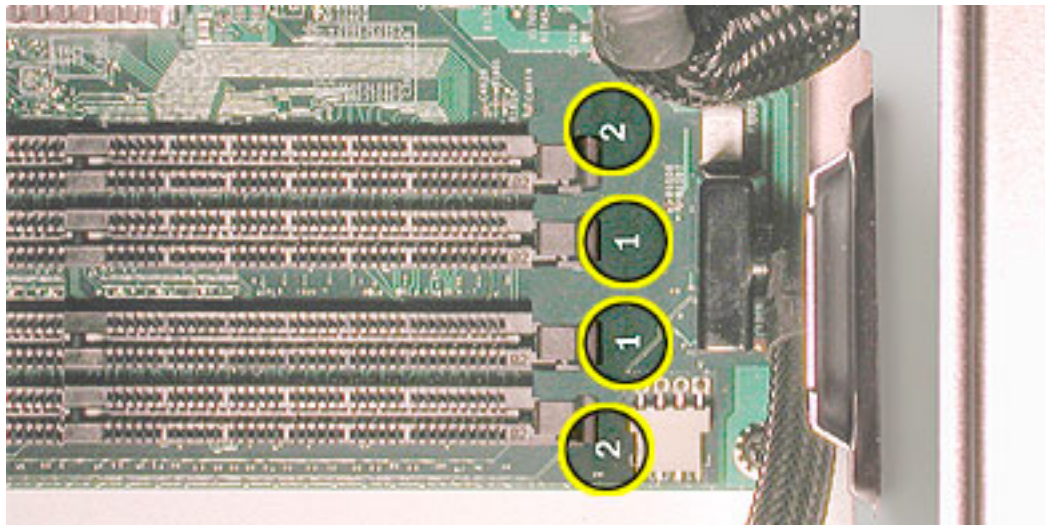
The advanced system management unit of the Power Mac G5 (Late 2004) employs advanced thermal and wattage management to keep acoustic noise of the fans to a minimum. The enclosure is divided into discrete zones, each with independently controlled fans bringing in cool air from the front of the enclosure, directing it over system components and exhausting it out the rear. Temperature and power consumption are monitored by the operating system, which communicates with the SMU, which in turn controls and monitors fan operation. Note that if Mac OS X is not booted, thermal management must be provided by the alternate development operating system.

The SMU monitors the wattage from 0 to 100 W. The fan speeds are increased proportionally, where 100 W operates the fans at highest speed. The wattage calculation does not include the 25 V ADC power output.

DDR Memory

In the Power Mac G5 (Late 2004) computer, PC3200/400 DDR-SDRAM DIMMs must be installed in pairs of equal size and speed. Memory from older Macintosh computers is not compatible. Do not try to install non-DDR memory as it will not fit in the DIMM slots and could cause damage.

The computers ship with a minimum of 256 MB of RAM, provided by a pair of 128 MB DIMMs installed in the two DIMM slots marked “1.” You can add DIMMs, provided they are installed as a pair of equal size, in the two DIMM slots marked “2.” A diagram on the logic board near the DIMM slots illustrates how the pairs must be installed.



Graphics Cards

The standard Power Mac G5 (Late 2004) computer comes with an Nvidia GeForce FX 5200 Ultra graphics card installed. The supported graphics cards are shown below:

Graphics Card	Video SDRAM	Connectors
Nvidia GeForce FX 5200 Ultra	64 MB DDR	ADC and DVI
ATI Radeon 9600 XT (CTO)	128 MB DDR	ADC and DVI
ATI Radeon 9800 XT (CTO)	256 MB DDR	ADC and DVI
Nvidia GeForce 6800 GT DDL (CTO)	256 MB DDR	Two dual-link DVIs
Nvidia GeForce 6800 Ultra DDL (CTO)	256 MB DDR	Two dual-link DVIs

The CTO ATI Radeon 9800 XT, Nvidia GeForce 6800 GT DDL, and Nvidia GeForce 6800 Ultra DDL cards occupy both the AGP slot and the adjacent PCI slot. For this reason, the number of available PCI slots is reduced from three to two.

All graphics cards support dual displays in either extended desktop or video mirroring mode, and support digital resolutions up to 1920x1200 pixels and analog resolutions up to 1600x1200 pixels. The Nvidia GeForce 6800 graphics cards support resolutions up to 2560 by 1600 pixels.

The display memory on the AGP card is separate from the main memory. The display memory consists of 64 MB (or 128 MB and 256 MB CTO) of DDR devices configured to make a 128-bit data bus. The display memory cannot be expanded by the user.

Ports

The following ports are included on the front and back panels of Power Mac G5 (Late 2004). The ports are the same as on the original Power Mac G5 computer. For illustrations of the port locations, see the “External Views” topic in the Views chapter.

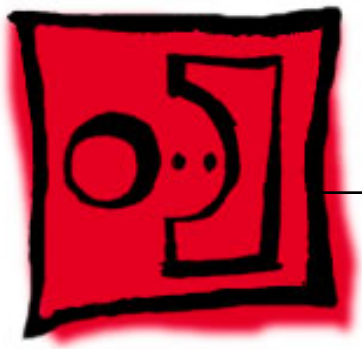
Front

- Power button
- Headphone port
- USB 2.0 port
- FireWire 400 port

Rear

- AirPort antenna port
- Bluetooth antenna port
- Optical audio-out port
- Optical audio-in port
- Audio line-out port
- Audio line-in port
- USB 2.0 ports (two ports)
- FireWire 400 port
- FireWire 800 port
- 10/100/1000Base-T Ethernet port
- Modem port

Service Source



Take Apart

Power Mac G5 (Late 2004)

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General Information

Orientation

For most take-apart procedures, it is recommended that you lay the computer on its side before removing or installing the part. For proper operation, however, Apple recommends that the unit be run in the upright position. The computer should never be operated on its side with the access panel facing down.

Tools

The following tools are required to service the computer:

- Magnetic Phillips screwdriver
- Flat-blade screwdriver
- Jeweler's flat-blade screwdriver
- Needlenose pliers
- Small wire cutter
- Mat knife or Xacto knife (to remove locking rivet on heatsink cover)
- Cup hook (to remove locking rivet)
- Small wooden stick (to remove locking rivet)
- Small mirror (for seeing small boards inside the enclosure)
- Soft cloth (to protect removed parts from scratches)

Parts Requiring Enclosure Replacement

The following are not separate, orderable parts. To replace them, you must replace the enclosure.

- Media fan
- Hard drive locking latches
- Hard drive bay
- Optical drive levers
- Media shelf
- Power harness cable, including hard drive power cables
- Air deflector sensor cable
- Media bay sensor cable
- Rear panel latch

Opening the Computer

Tools

No tools are required for this procedure.

Preliminary Steps

1. Shut down the computer.

   Warning: Always shut down the computer before opening it to avoid damaging its internal components or the components you are installing. Do not open the computer or attempt to install items inside it while it is on.

2. Wait 5 to 10 minutes to allow the computer's internal components to cool.

   Warning: After you shut down the system, the internal components can be very hot. You must let the computer cool down before continuing.

3. Unplug all external cables from the computer except the power cord.

4. Touch the metal PCI access covers on the back of the computer to discharge any static electricity from your body.

   Important: Always discharge static before you touch any parts or install any components inside the computer. To avoid generating static electricity, do not walk around the room until you have finished working and closed the computer.

5. Unplug the power cord.

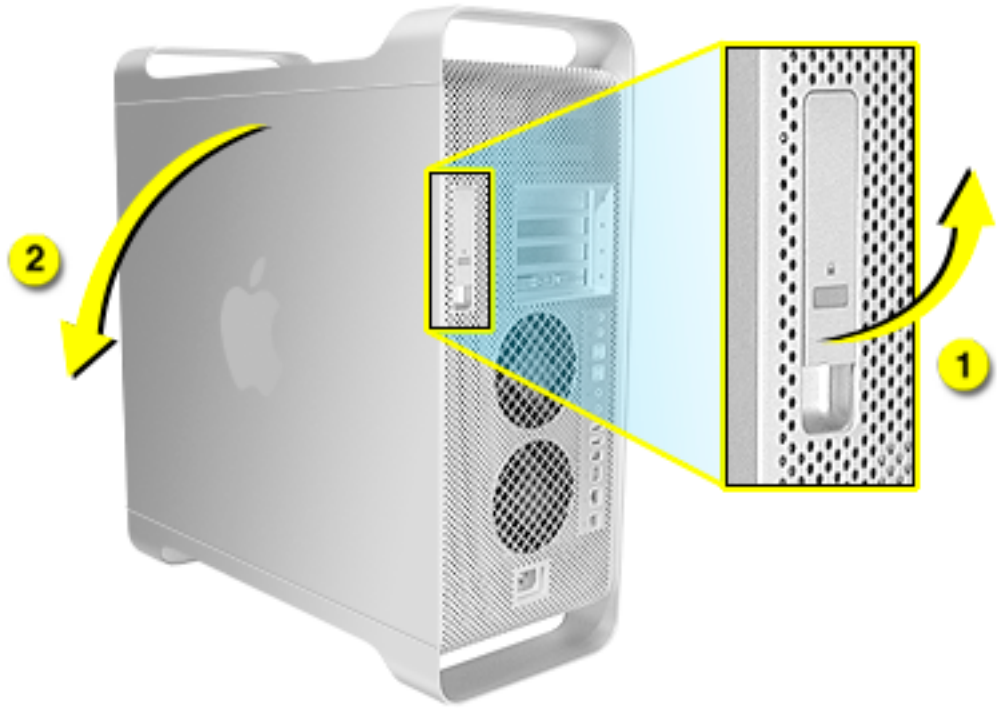
6. Put on an ESD wrist strap.

Procedure

1. Hold the side access panel and lift the latch on the back of the computer.

Warning: The edges of the access panel and the enclosure can be sharp. Be very careful when handling them.

2. Remove the access panel and place it on a flat surface covered by a soft, clean cloth.



Replacement Note: Make sure the latch is in the up position before replacing the access panel. If the latch is down, the access panel will not seat correctly in the enclosure.

3. Remove the air deflector and place it on a soft, clean cloth.

Replacement Note: To replace the air deflector, insert the three tabs on the bottom edge of the deflector into the three slots in the bottom frame of the enclosure. Then swing the deflector up flush against the top frame of the enclosure.

Important: Make sure you re-install the air deflector before replacing the access panel. If the air deflector is not installed, the computer will not function properly.

Serial ATA Hard Drive

The Power Mac G5 computer can accommodate two serial ATA hard drives in its internal hard drive bay. In most configurations, a single hard drive occupies the top portion of the bay. You can install one additional serial ATA hard drive in the empty slot in the bay.

Important: Use the original Apple cables that came with the Power Mac G5 when installing ATA hard drives.

Tools

The only tool required for this procedure is a Phillips screwdriver.

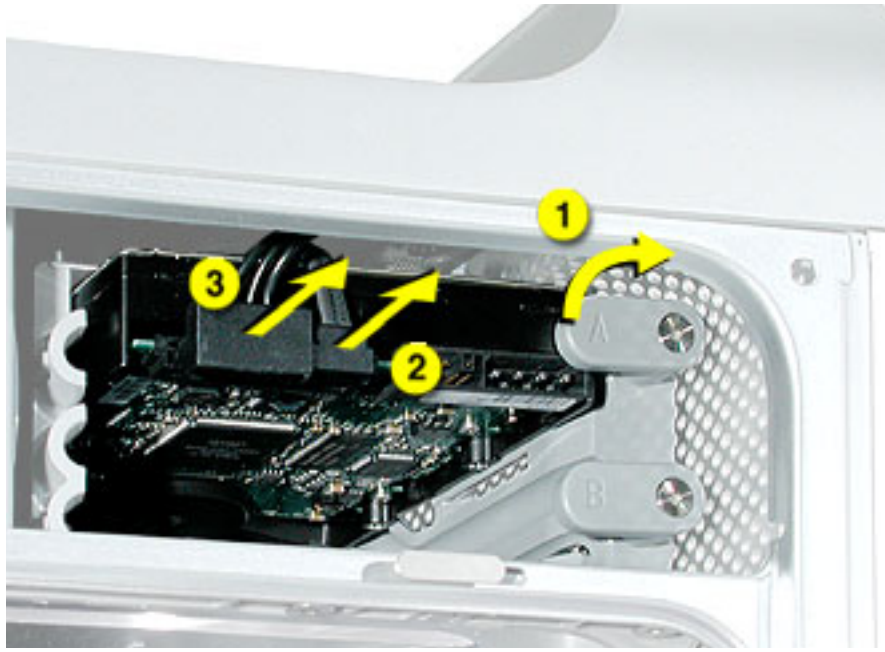
Preliminary Steps

Before you begin, open the computer.

Part Location

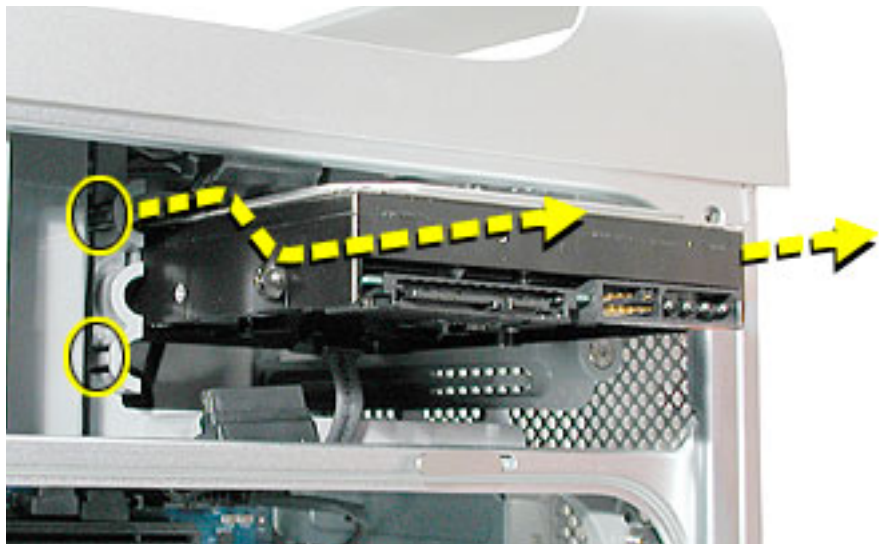
Procedure

1. Release the drive locking latch by rotating it up.
2. Disconnect the drive data cable and power cable from the hard drive.



3. Pull the drive out of the drive bay, being careful not to touch the bottom of the drive.

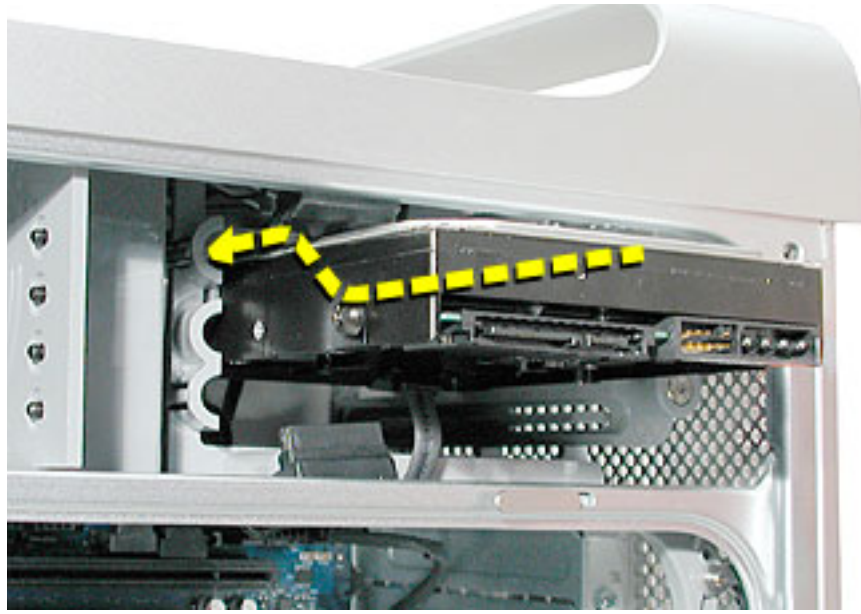
   Note: If you encounter resistance, use a flatblade screwdriver to release the latches on the drive bay rails as you pull the drive out of the bay. (See circled areas on the illustration below.) If two drives are installed, remove the bottom drive first.



Important: If the printed circuit board (PCB) is exposed on the bottom of the hard drive, hold the drive by its sides. To avoid damaging the replacement drive, take care not to touch the PCB during installation.

Replacement Note: If you are replacing a hard drive with a new drive, transfer the four guide screws from the sides of the original drive to the new drive. If you are installing an additional drive, transfer the guide screws from the side of the hard drive bay to the drive.

Replacement Note: When replacing the top drive, make sure the guide screws align with the middle slot of the drive bay, and then gently push the drive into the bay until it snaps into place in the top position.



When installing a bottom drive, align the guide screws with the bottom slot of the drive bay and slide the drive in until it snaps into place.

Serial ATA Hard Drive Data Cable

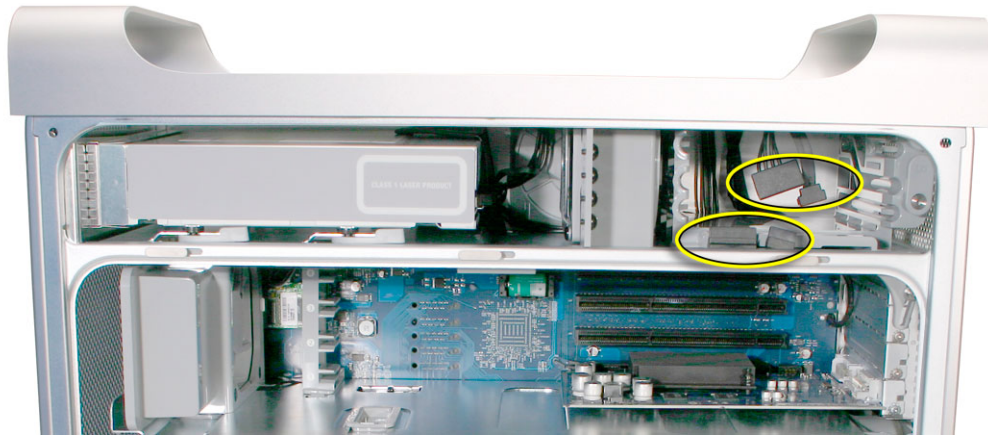
Tools

The only tool required for this procedure is a small wire cutter.

Preliminary Steps

Before you begin, open the computer and remove the hard drive(s).

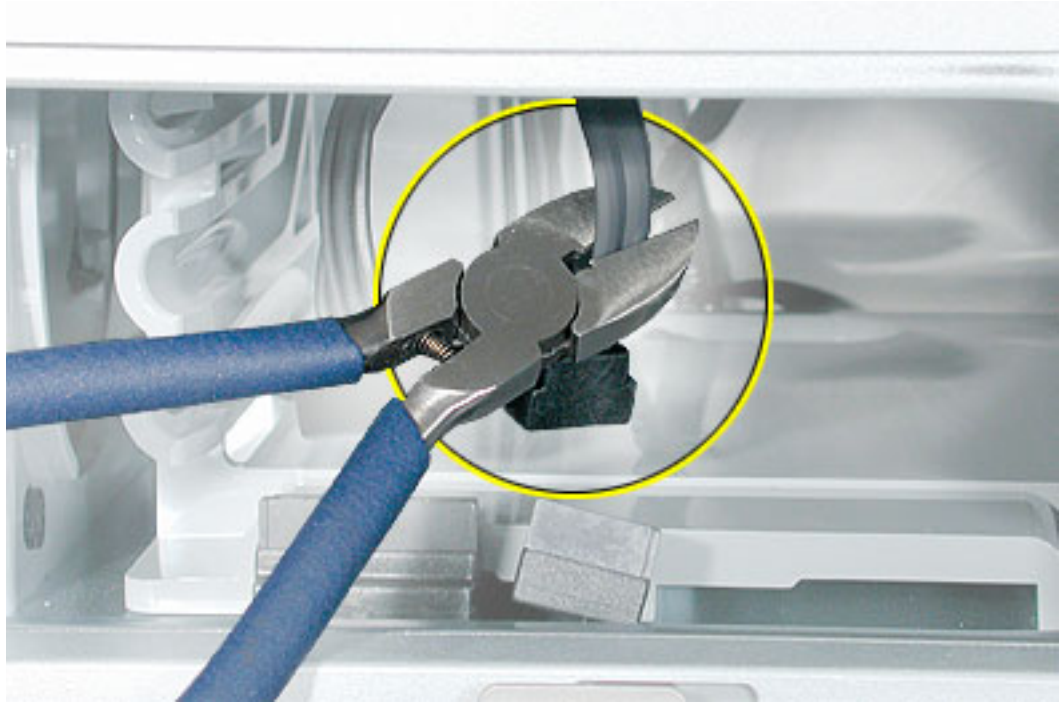
Part Location



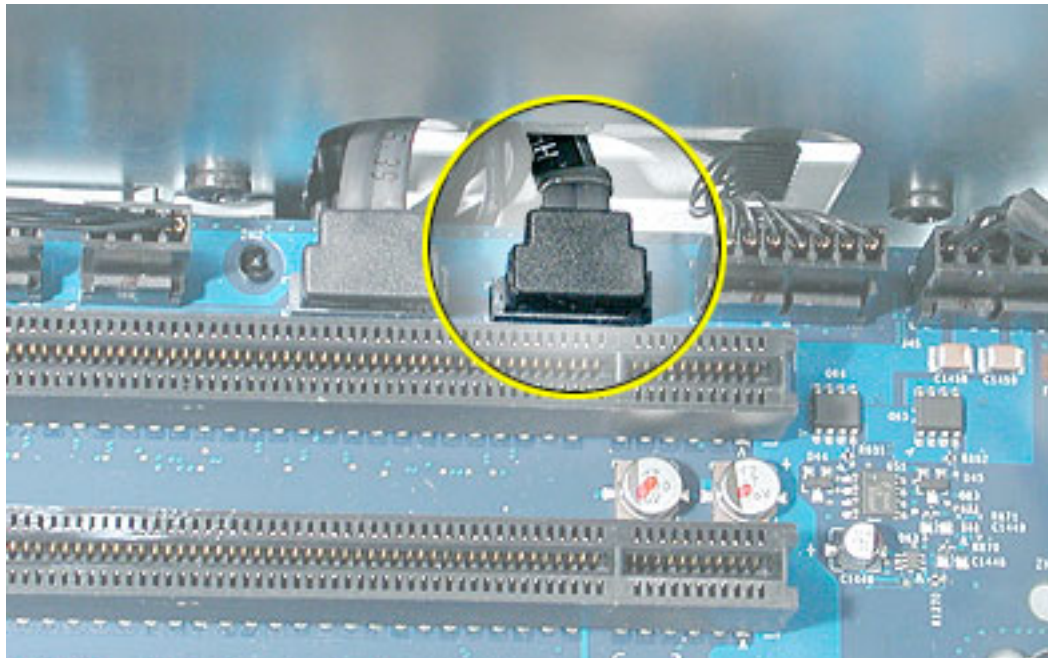
Procedure

Upper Hard Drive Data Cable

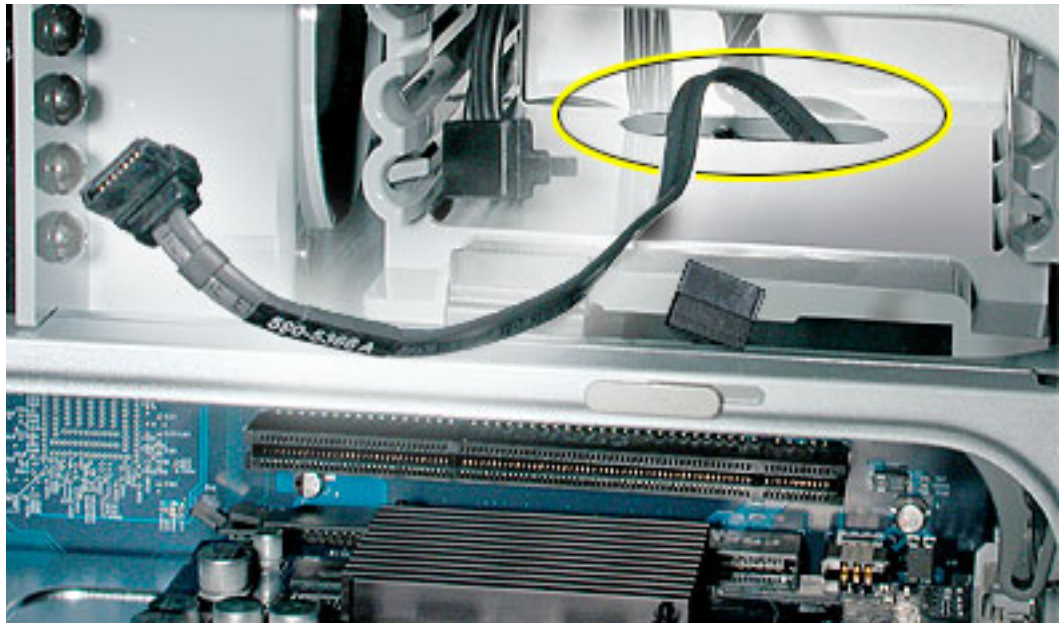
1. Clip off the connector from the hard drive end of the upper hard drive data cable.



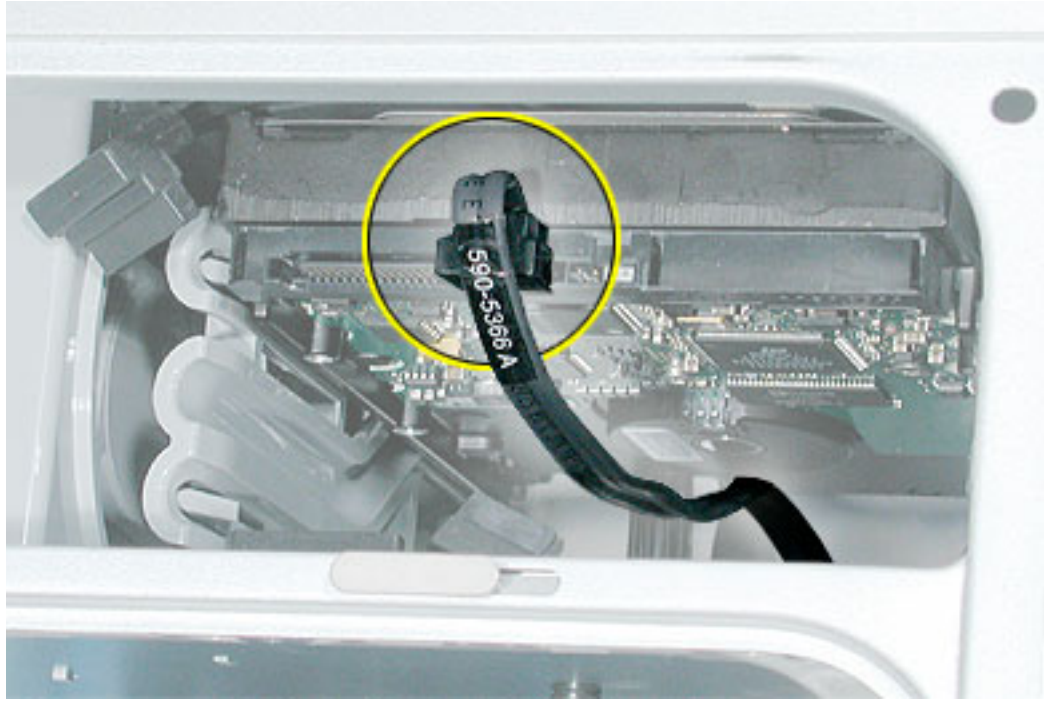
2. Disconnect the cable from the logic board, pull the cable out of the hard drive bay, and remove the cable from the enclosure.



Replacement Note: When installing the replacement upper hard drive cable, first route the cable through the opening in the hard drive bay.

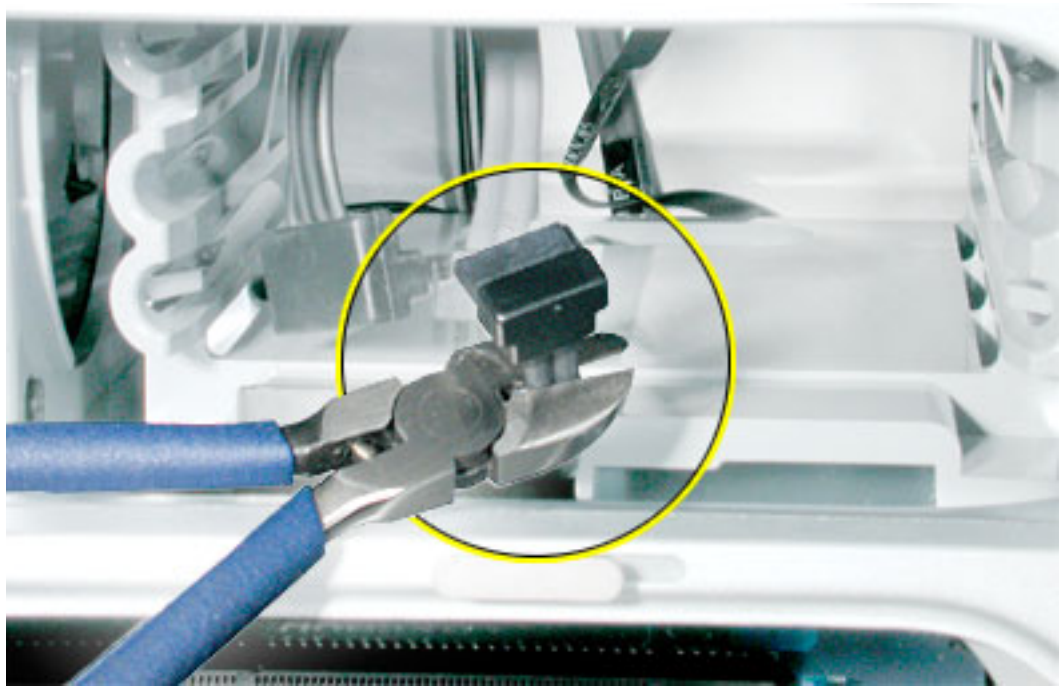


Then install the upper hard drive with the cable routed below the drive, and connect the cable to the drive as illustrated.

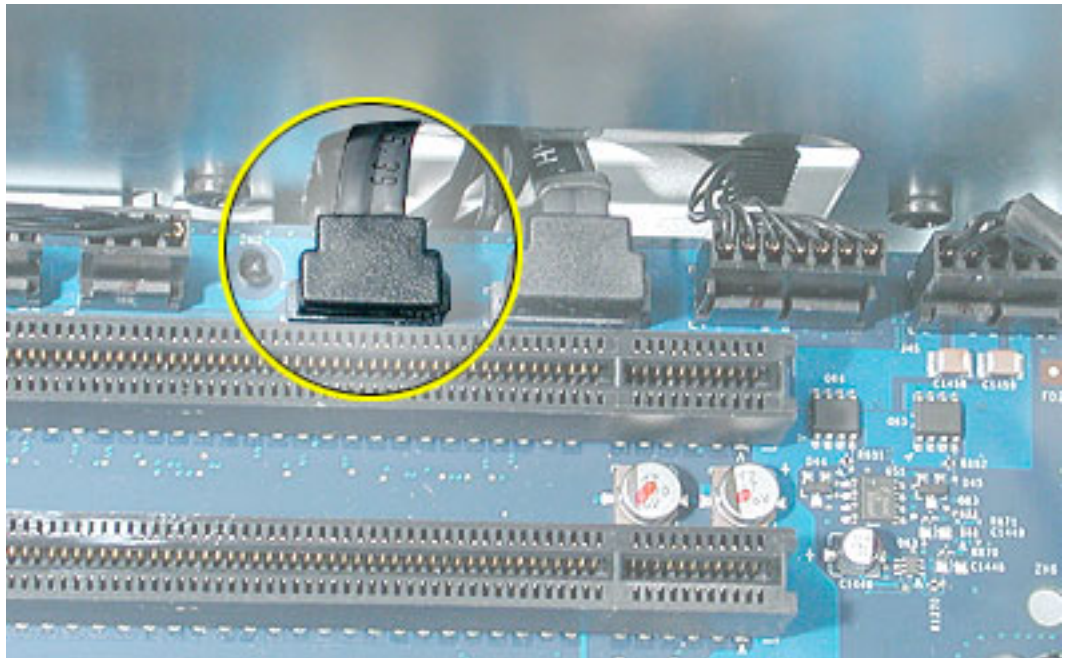


Lower Hard Drive Data Cable

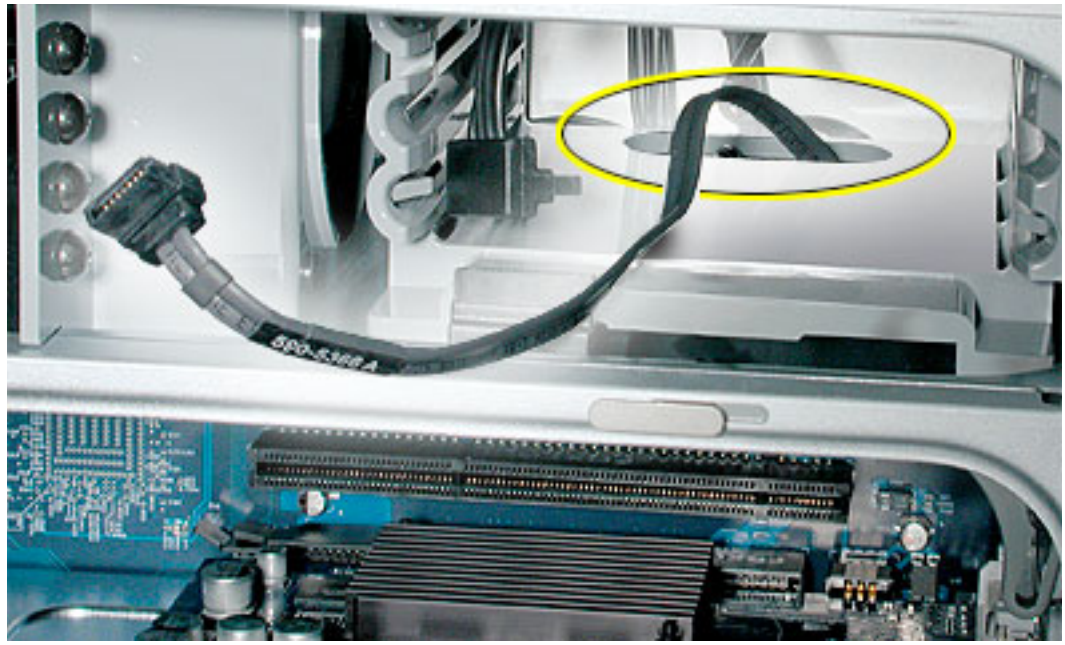
1. Clip off the connector from the hard drive end of the lower hard drive cable.



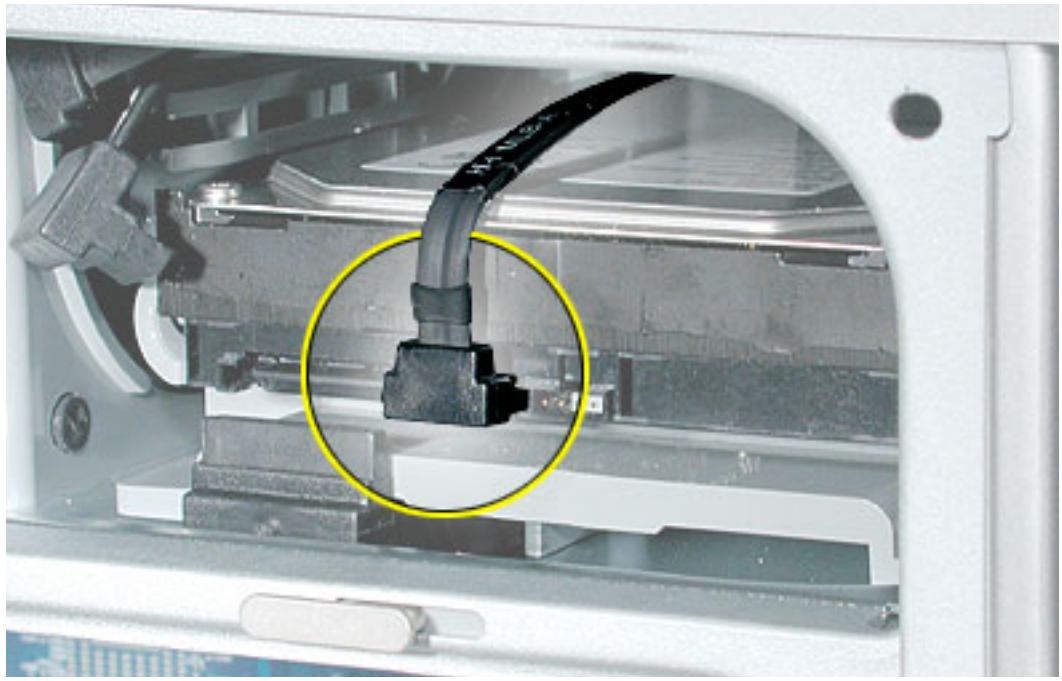
2. Disconnect the cable from the logic board, pull the cable out of the hard drive bay, and remove the cable from the enclosure.



Replacement Note: When installing the replacement lower hard drive cable, first route the cable through the opening in the hard drive bay.



Then install the lower hard drive with the cable routed above the drive, and connect the cable to the drive as illustrated.



Optical Drive

Important: When installing a replacement optical drive, use the original Apple cables that came with the Power Mac G5.

Tools

No tools are required for this procedure.

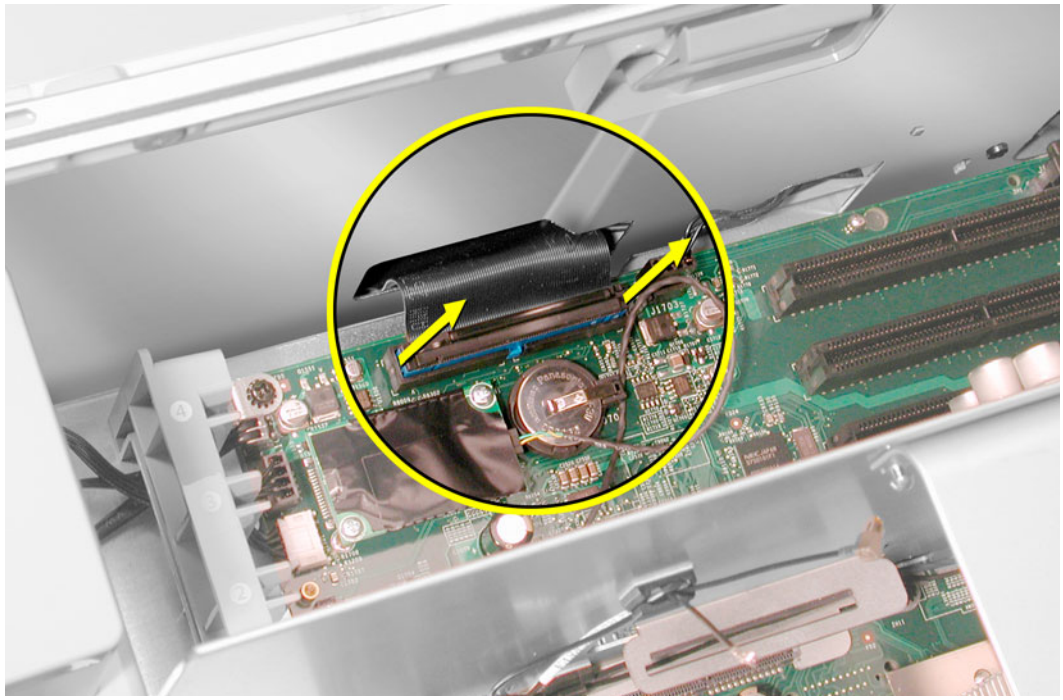
Preliminary Steps

Before you begin, open the computer.

Part Location

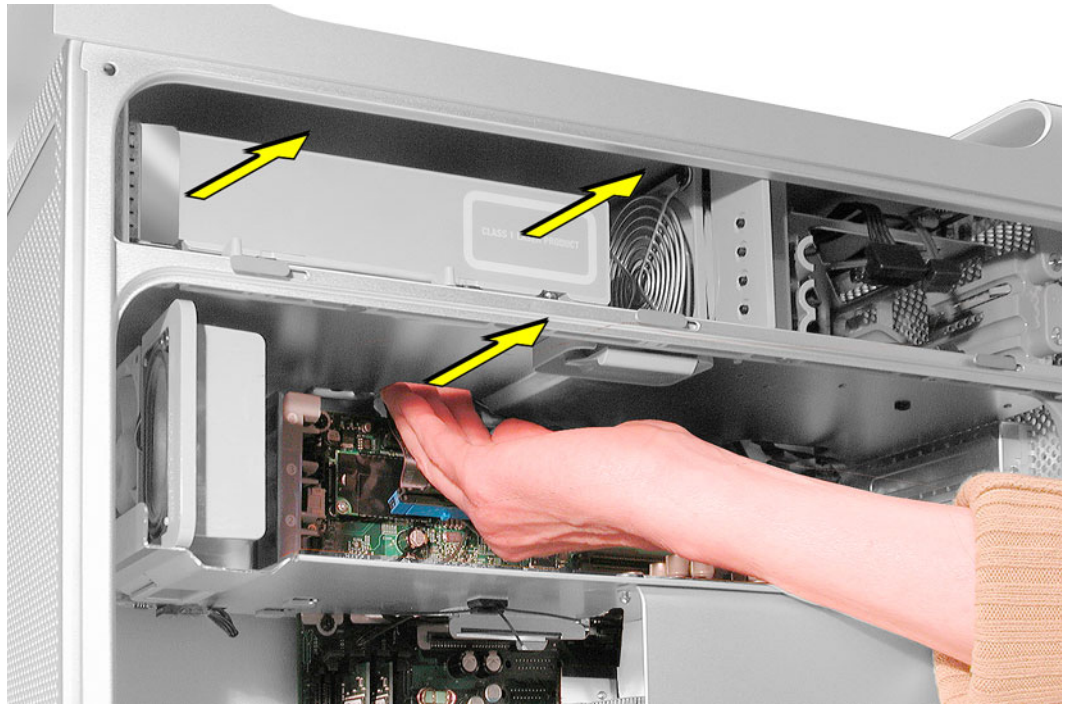
Procedure

1. Disconnect the optical drive ribbon cable from the logic board. (The cable connector is located under the media shelf that holds the optical drive.)

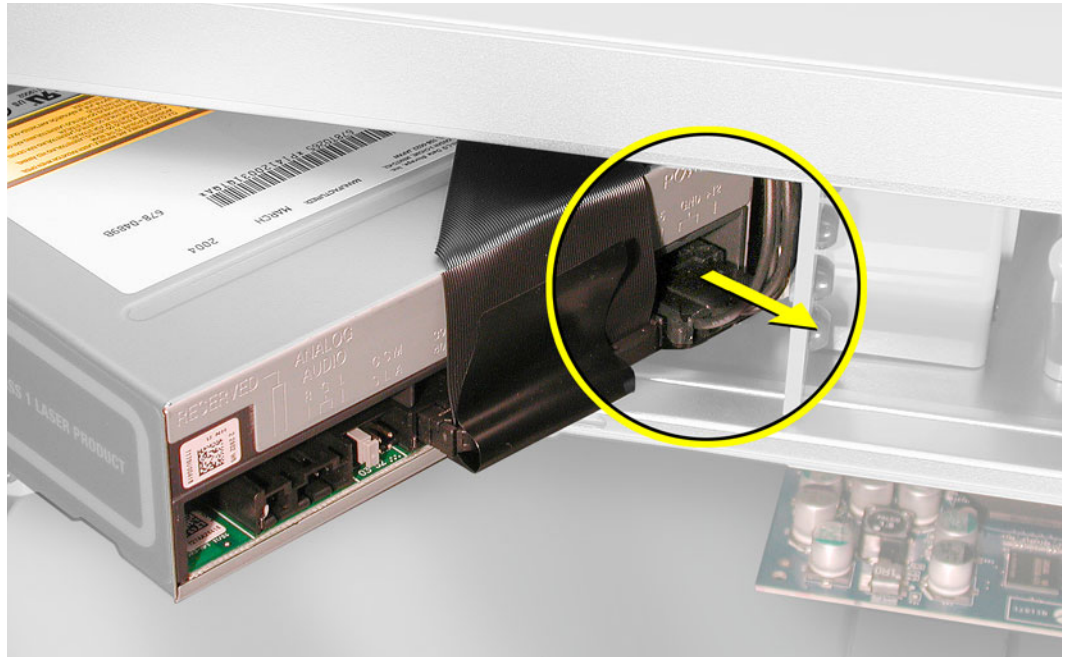


2. Push the optical drive levers out to release the drive.

3. Place the fingers on one hand inside the opening for the optical drive cable and push the edge of the drive forward. The drive will move part way out of the media shelf.



4. Disconnect the power cable from the drive.



5. Route the drive ribbon cable out through the opening in the media shelf and remove the drive and ribbon cable from the computer.

6. If you are replacing the drive with a new drive, install the standoffs on the bottom of the new drive.

   Note for SuperDrives: Two bags of standoffs are included with the replacement drive. Use the standoffs with a Phillips head on Sony drives; use the standoffs with a hex head on Toshiba and Pioneer drives.

   Note for Combo Drives: Use only the standoffs that are included with the new drive. Do not transfer the standoffs from the original drive to the replacement drive.

7. Disconnect the ribbon cable from the back of the drive, and then carefully pry the cable from the top of the drive. Transfer the cable to the top of the replacement drive, and connect the cable to the drive.

   Note: Reusable adhesive tape on the underside of the cable attaches the cable to the drive. When removing the cable from the original drive, be careful to keep the tape with the cable.

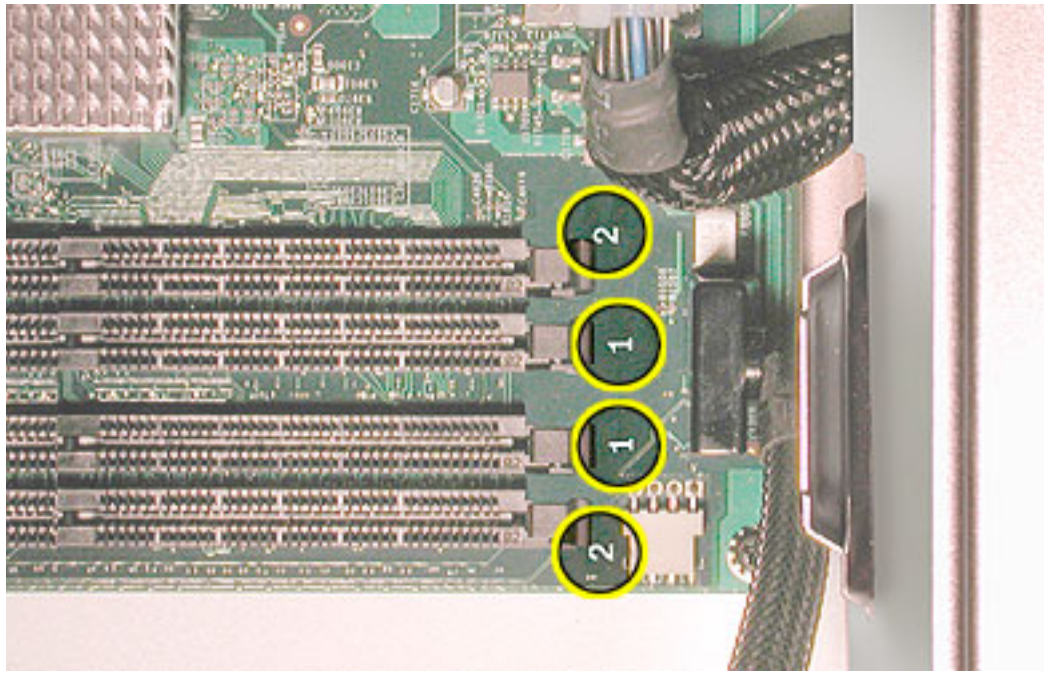
8. Carefully remove the EMI shield from the front of the original drive and transfer it to the front of the replacement drive.

Replacement Note: Insert the optical drive part way into the optical drive bay, and connect the power cable to the drive. Then bend down the free end of the ribbon cable, route it through the opening at the back of the media shelf, and connect the cable to the logic board.

Memory (DIMMs)

Power Mac G5 (Late 2004) computers have four Dual Inline Memory Module (DIMM) slots. Each slot accepts 400 Mhz Double-Data-Rate (DDR) Synchronous Dynamic Random-Access Memory (SDRAM) devices.

The computers ship with a minimum of 256 MB of RAM, provided by a pair of 128 MB DIMMs installed in the two DIMM slots marked “1.” You can add DIMMs, provided they are installed as a pair of equal size, in the two DIMM slots marked “2.” A diagram on the logic board near the DIMM slots illustrates how the pairs must be installed.



DIMMs must fit these specifications:

- 400 MHz DDR
- 2.5 volt
- 184-pin module
- Maximum number of memory devices on DDR SDRAM:16.
- Nonparity
- No error correcting codes (ECC)
- Unbuffered (registered or buffered DDR SDRAM cannot be used)

Important: Always install DIMMs in pairs of equal size. Memory from older Macintosh computers is not compatible with the Power Mac G5. Do not use older memory, even if it fits into the DIMM slots.

Tools

No tools are required for this procedure.

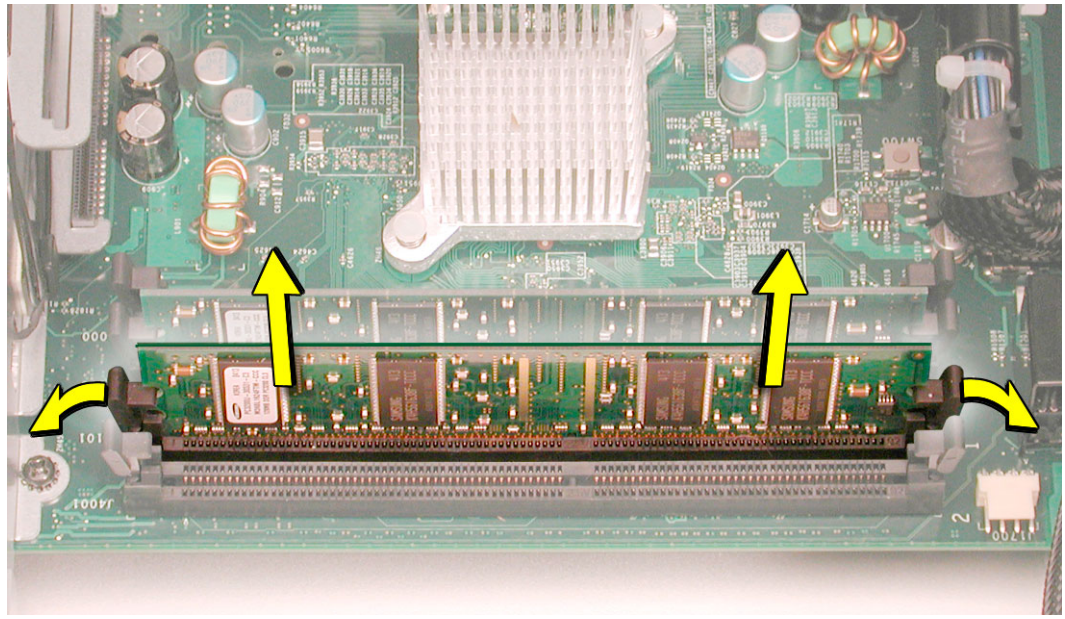
Preliminary Steps

Before you begin, open the computer, and lay it on its side with the access side facing up.

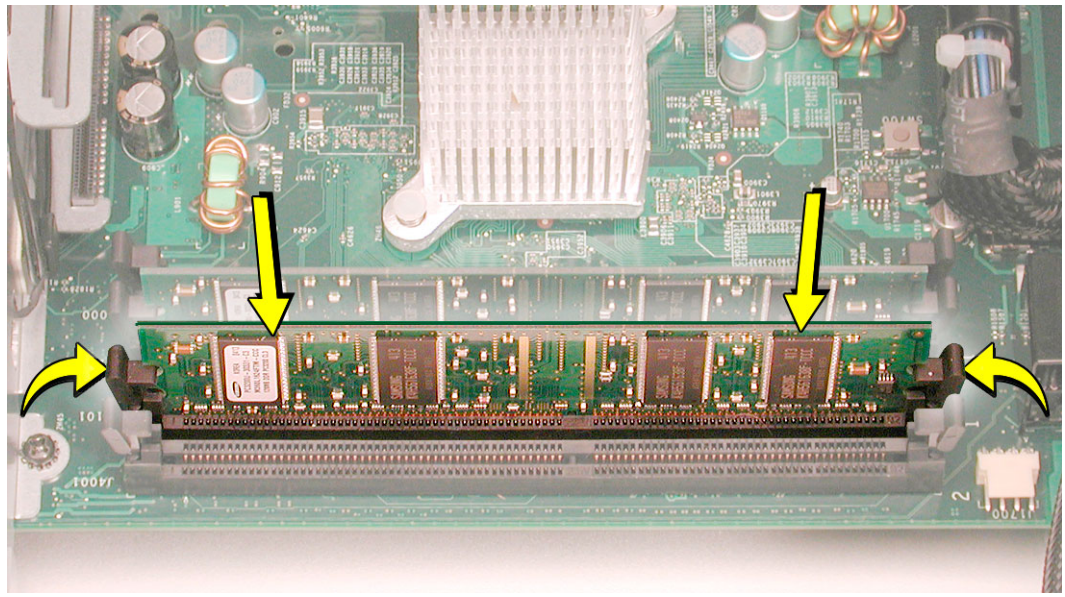
Part Location

Procedure

1. Locate the DIMM slots on the logic board.
2. Open the ejectors on the DIMM slot by pushing them out to the sides.
3. Holding the DIMM by both top corners, lift it straight up out of the computer.



Replacement Note: Align the DIMM in the slot and push both ends of the DIMM down until the tabs are vertical and the ejectors snap into place.

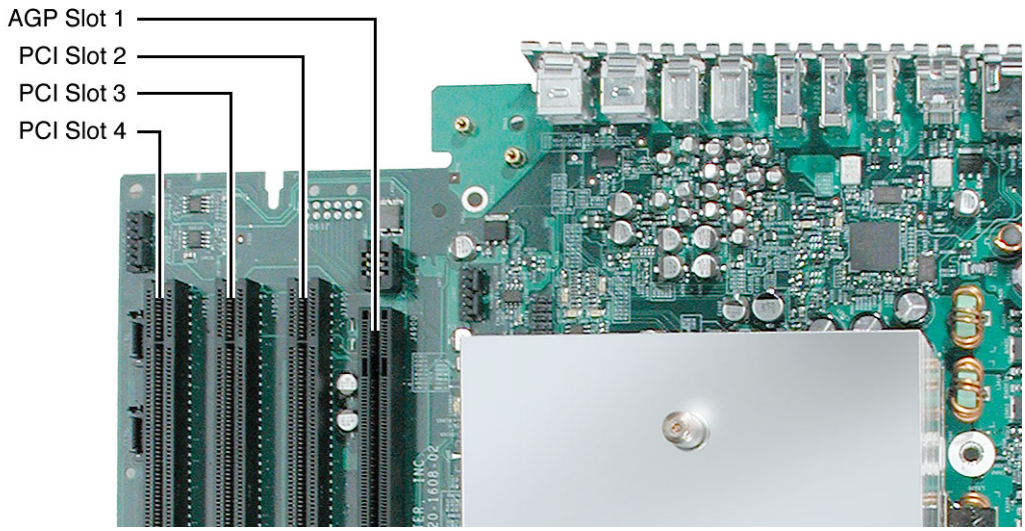


Important: Do not touch the DIMM connectors. Handle the DIMM only by the edges.

AGP/PCI Card

Power Mac G5 computers have four expansion card slots, three of which accommodate Peripheral Component Interconnect (PCI) cards and one that accepts an advanced graphics port (AGP) video card. AGP cards and PCI cards have different connectors, so you cannot insert a PCI card into the AGP slot.

Note: Maximum power consumption for all four expansion slots (the three PCI expansion cards and the AGP card) should not exceed 90 watts (W).



AGP Cards

The AGP video card, installed in slot 1, contains the graphics processor unit (GPU) and provides the computer's display ports. Slot 1 is designed specifically to accept AGP cards.

PCI Cards

The remaining three expansion slots, labeled 2, 3, and 4, accommodate PCI cards up to 12 inches long.

Note: Certain high-performance AGP graphics cards, when installed in slot 1, block access to the adjacent PCI slot. In this case, PCI cards can be installed in slots 3 and 4 but not in slot 2.

Tools

The only tool required for this procedure is a Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer and lay it on its side with the access side facing up.

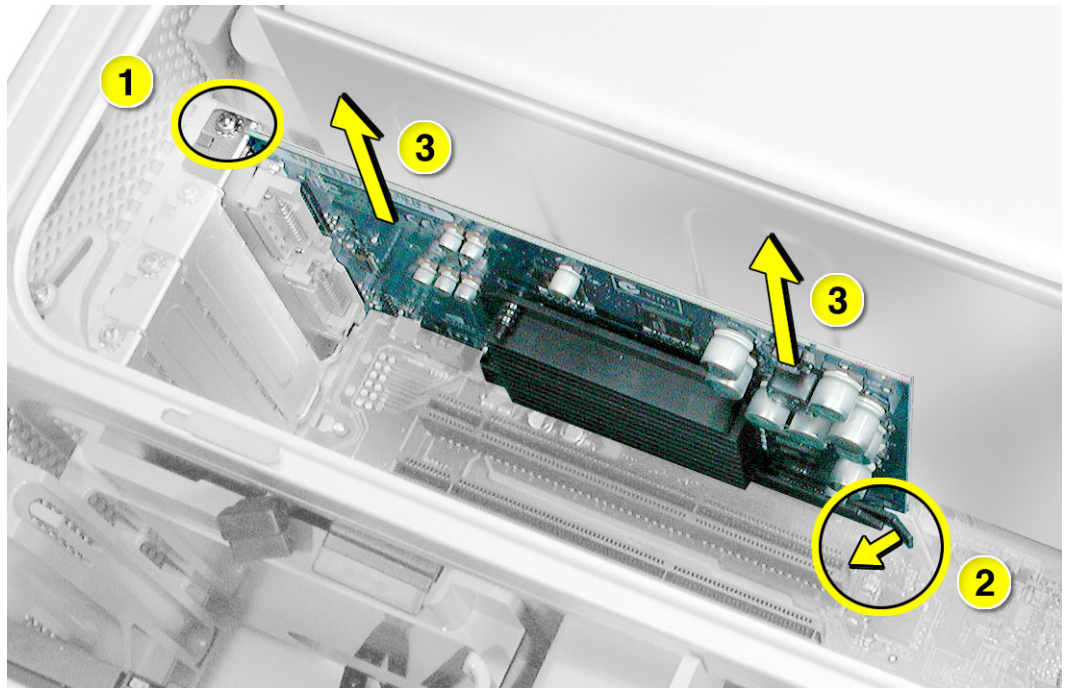
Part Location

Procedure

Install an AGP video card in slot 1 only. Install either PCI or PCI-X cards in the slots labeled 2, 3, and 4.

Warning: When removing or installing a PCI or AGP card, handle it only by the edges. Do not touch its connectors or any of the components on the card. Lift the card straight out from the connector to remove it, and insert it straight into the connector to install it. Do not rock the card from side to side and don't force the card into the slot. Once the replacement card is installed, pull on it gently to check that it is properly connected.

1. Remove the screw that mounts the card to the enclosure.
2. If you are removing an AGP card, pull back the small locking clip at the front of the AGP connector.
3. Holding the card by the top corners, gently pull up the card and remove it from its expansion slot.



Replacement Note: Align the card's connector with the expansion slot and press until the connector is inserted all the way into the slot. If you're installing a 12-inch card, make sure the card engages the appropriate slot in the PCI card guide.

- Don't rock the card from side to side; instead, press the card straight into the slot.
- Don't force the card. If you meet a lot of resistance, pull the card out. Check the connector and the slot for damage or obstructions, then try inserting the card again.
- Pull the card gently to see if it is properly connected. If it resists and stays in place, and if its gold connectors are barely visible, the card is connected.

AirPort Extreme Card

Only the AirPort Extreme Card may be installed in the Power Mac G5. Older AirPort Cards do not work in this computer.

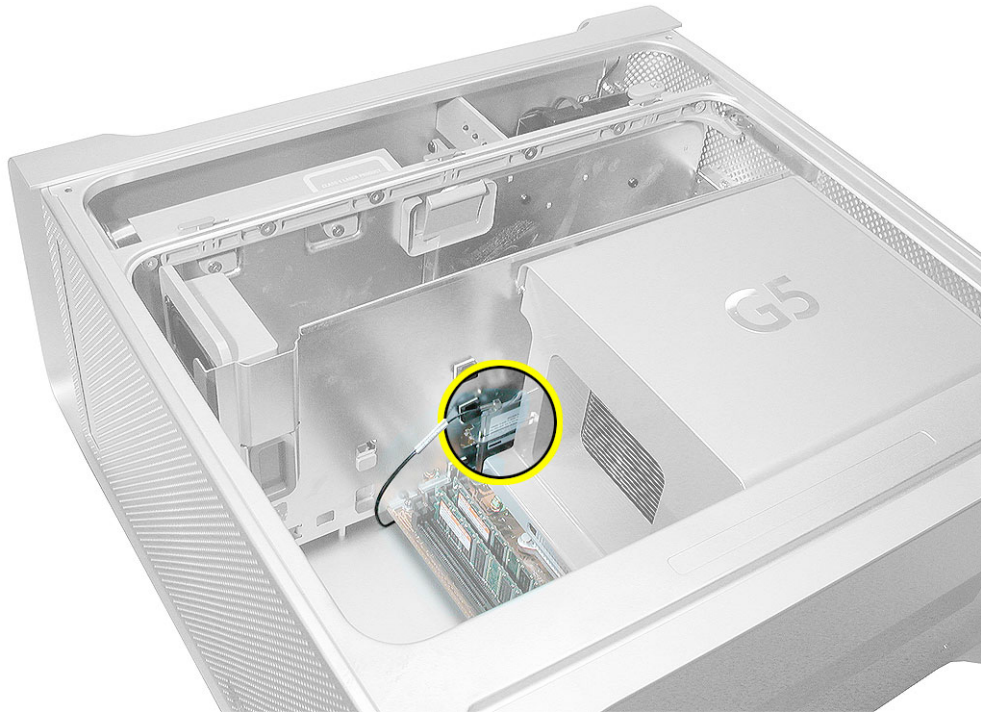
Tools

No tools are required for this procedure.

Preliminary Steps

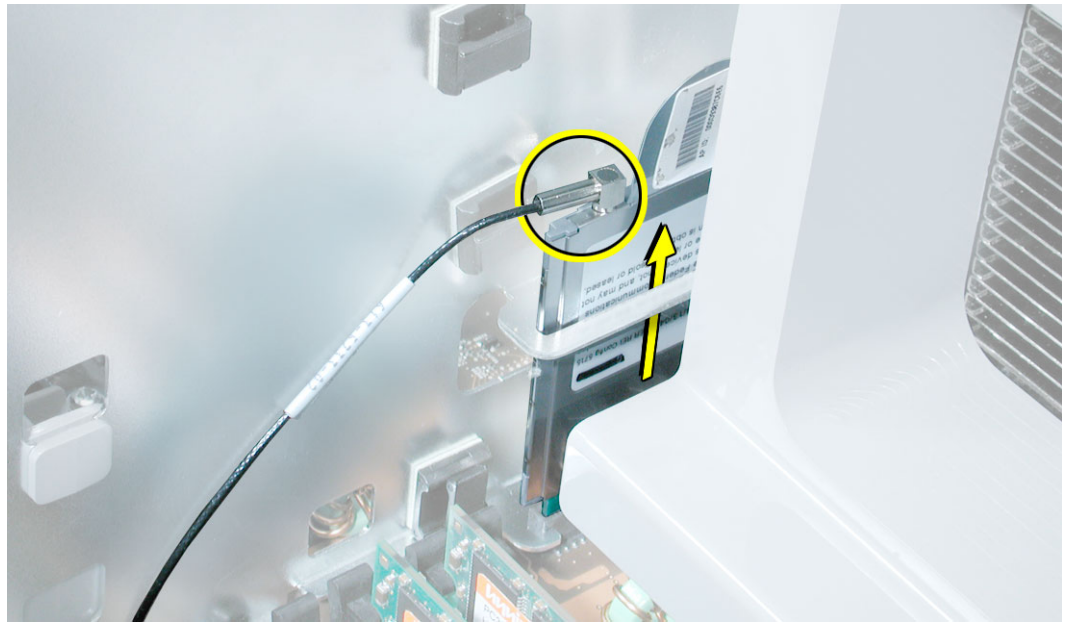
Before you begin, open the computer and lay it on its side with the access side facing up.

Part Location



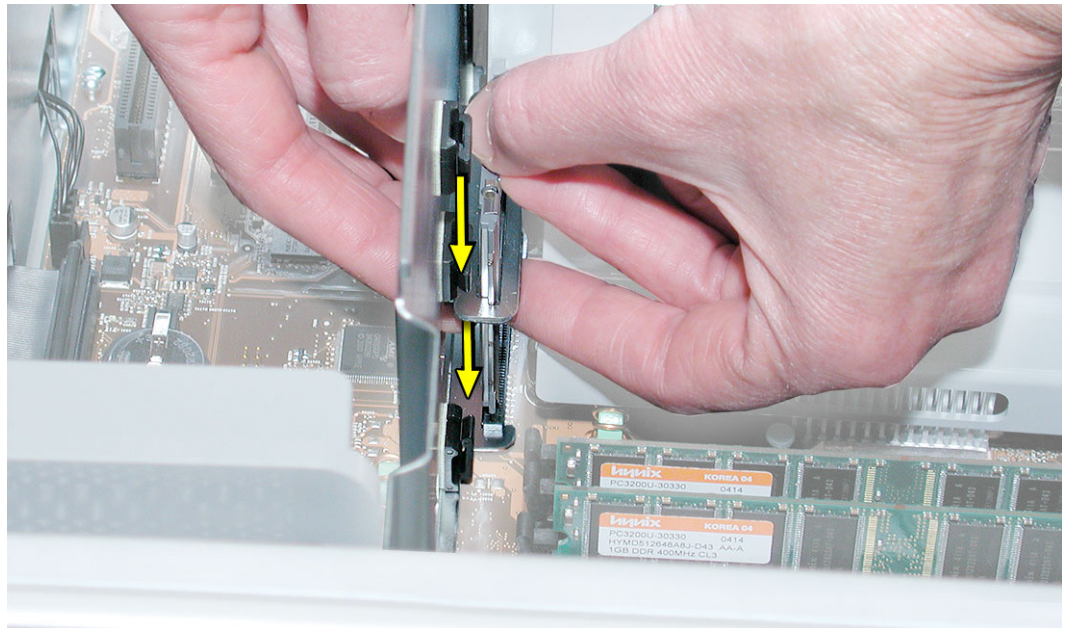
Procedure

1. Carefully disconnect the antenna cable from the end of the AirPort Extreme Card.
2. Pull the card straight back out of the enclosure.



Replacement Note: Placing a hand on each side of the card, guide the card down into the logic board connector, making sure to align the front edge of the card's connector with the front of the logic board connector.

Important: Be sure to reconnect the antenna cable to the card.



Modem Board

Tools

The only tool required for this procedure is a Phillips screwdriver.

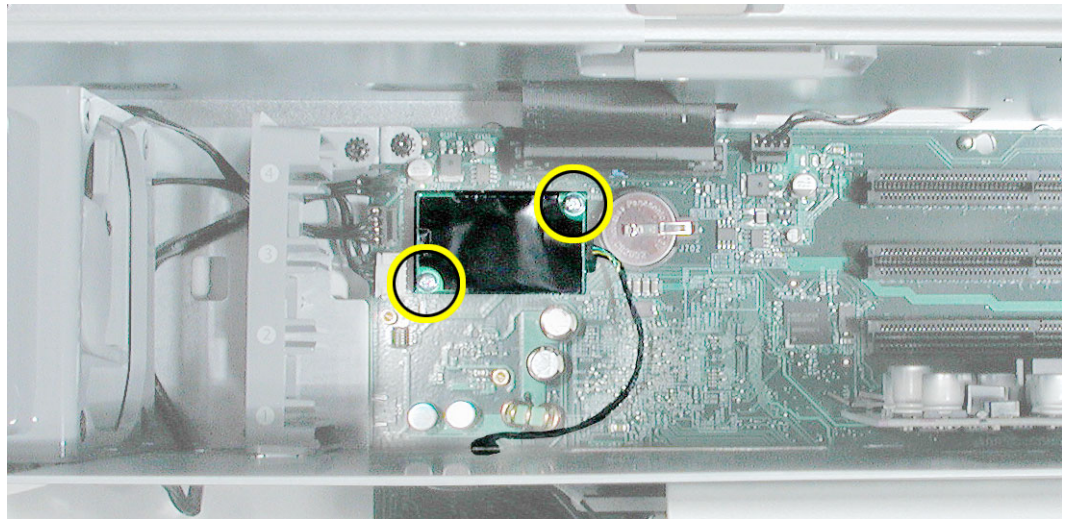
Preliminary Steps

Before you begin, open the computer and lay it on its side with the access side facing up.

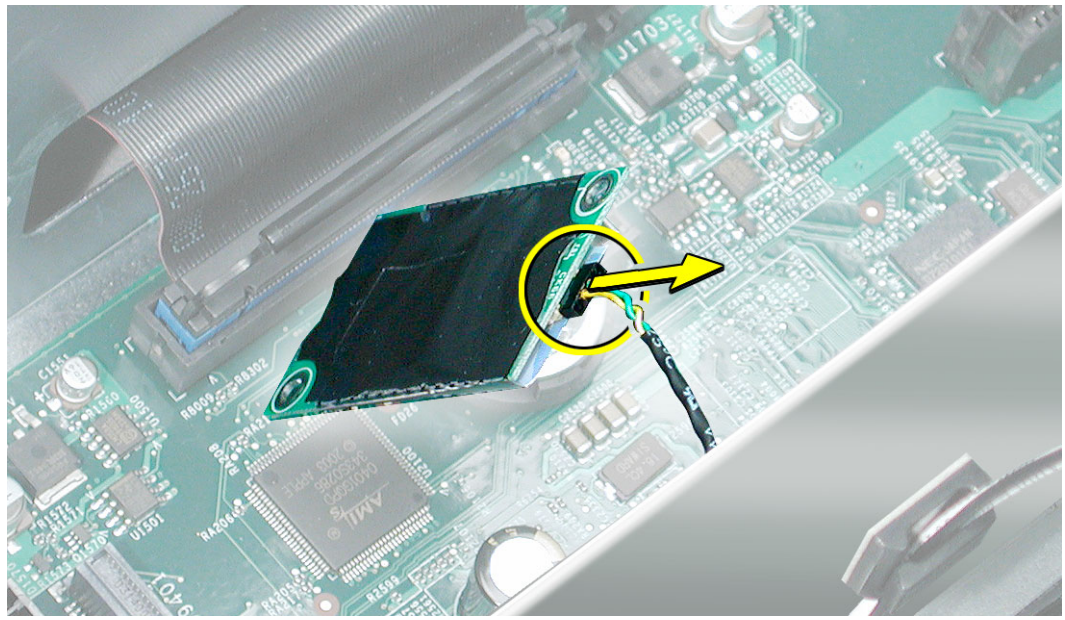
Part Location

Procedure

1. Remove the two screws that secure the modem board.



2. Lift the board slightly and disconnect the modem filter cable from the modem board.



3. Remove the modem from the enclosure.

Important: Be sure to reconnect the modem filter cable before reinstalling the modem.

Bluetooth Card

Tools

The only tool required for this procedure is a Phillips screwdriver.

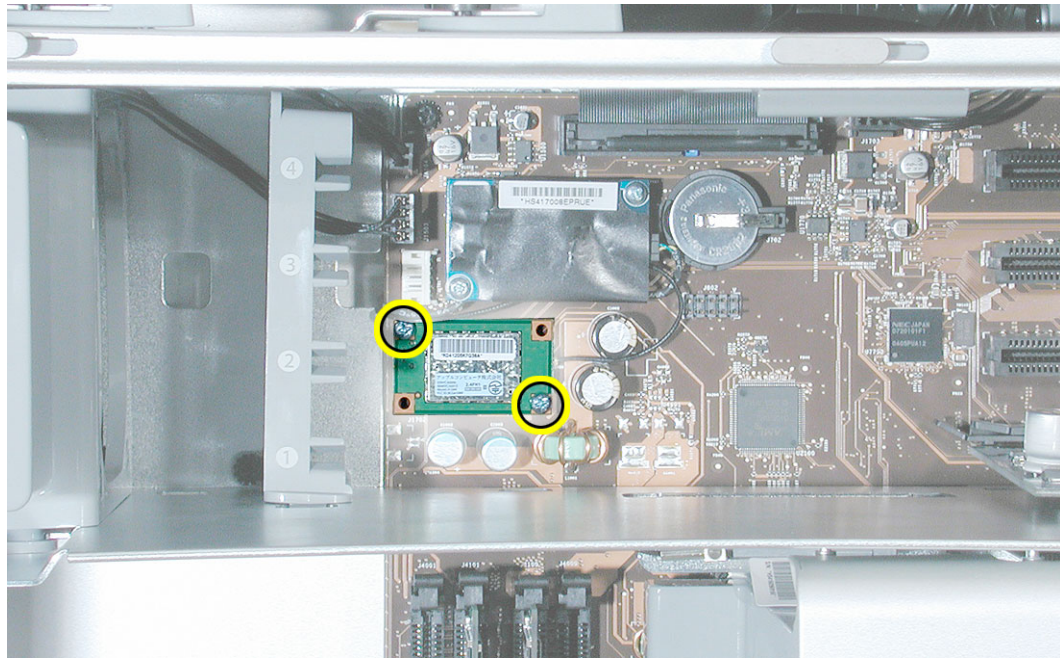
Preliminary Steps

Before you begin, open the computer and lay it on its side with the access side facing up.

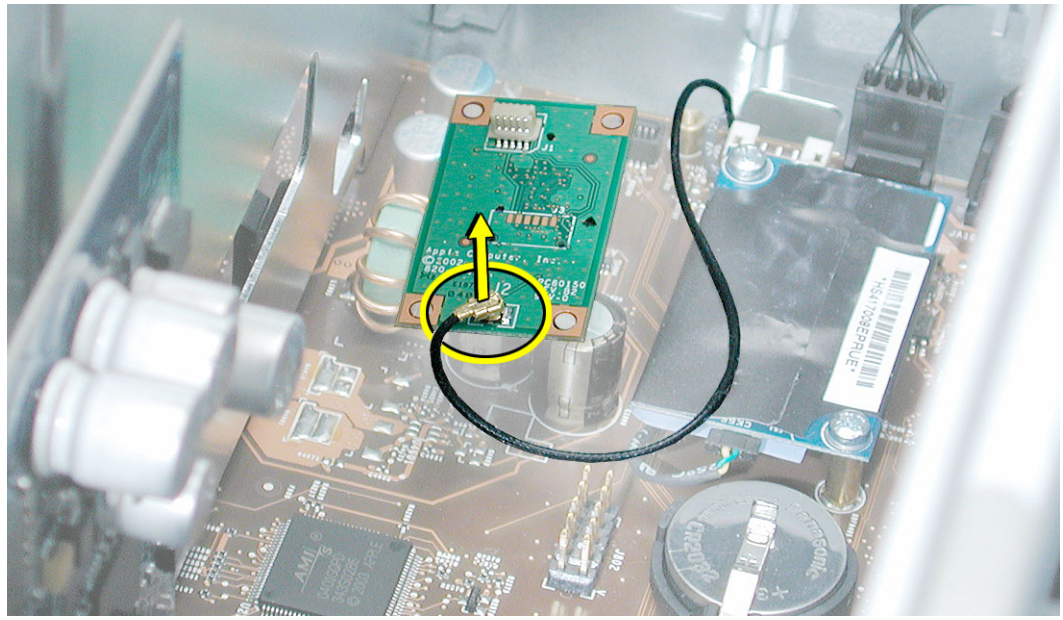
Part Location

Procedure

1. Remove the two Bluetooth card mounting screws.



2. Lift the Bluetooth card straight up a short distance to disconnect it from the logic board. Then turn the card over, and disconnect the Bluetooth antenna cable from the underside of the card.



Replacement Note: Be very careful connecting the antenna cable to the Bluetooth card. The connector is fragile and can easily be bent.

Battery

Tools

No tools are required for this procedure. You may, however, find a jeweler's flat-blade screwdriver useful in removing the battery from its holder.

Preliminary Steps

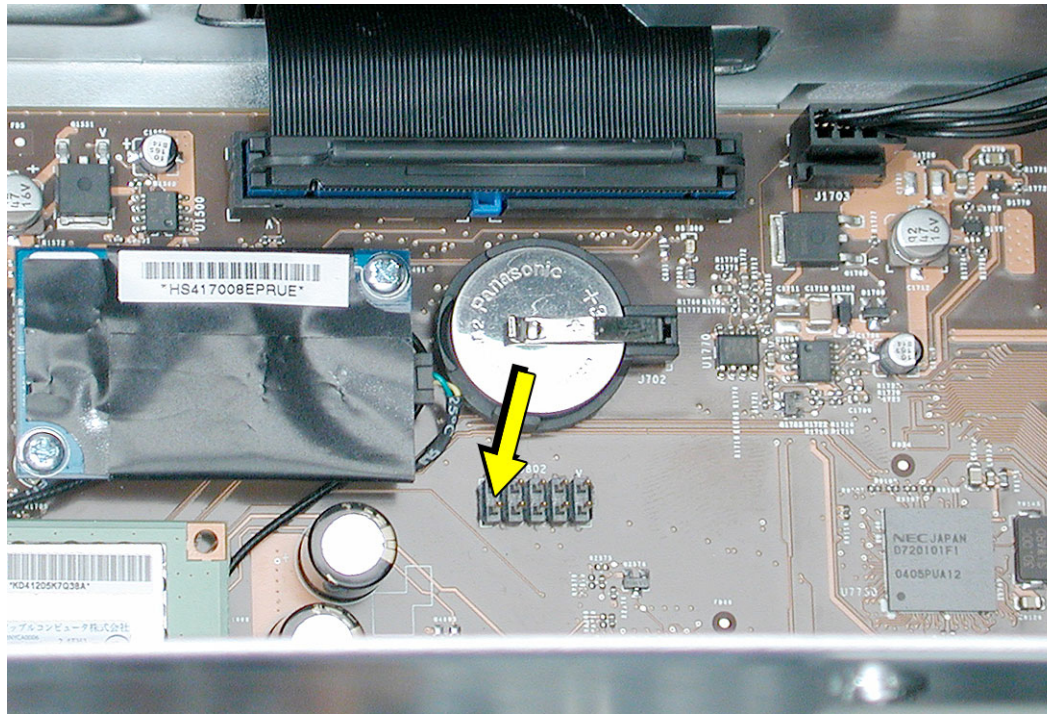
Before you begin, open the computer and lay it on its side with the access side facing up. If a PCI card is installed in the slot next to the battery, remove the card.

Part Location

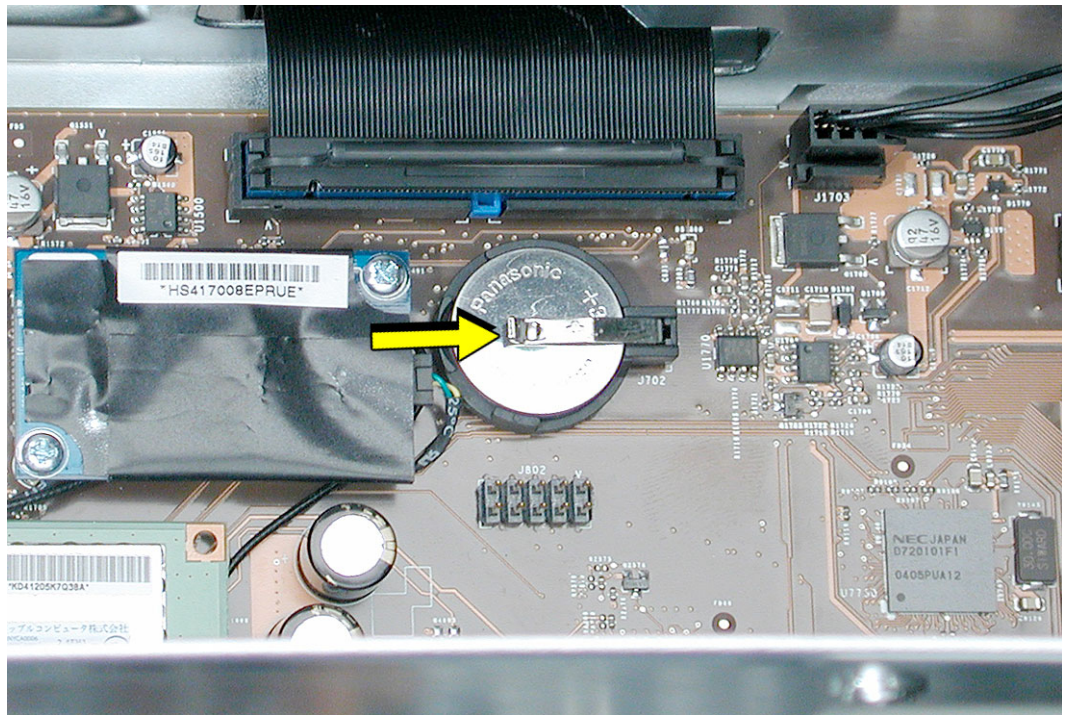
Procedure

1. Insert a fingernail or jeweler's flat-blade screwdriver into the cut-out in the side of the battery holder and lift the battery slightly.
2. Slide the battery out from underneath the holder's metal clip and over the edge of the battery holder.

   Note: Be careful when sliding the battery from underneath the clip. Pulling up on the clip may cause it to break off.
3. Remove the battery from the enclosure.



Replacement Note: Insert the new battery under the battery holder clip, making sure the side of the battery with the positive symbol faces up and touches the clip.



Warning: Installing the battery incorrectly may cause an explosion. Be sure the battery's positive symbol faces up in the holder. Use only the same type of battery or an equivalent recommended by the manufacturer of the original.

Important: Batteries contain chemicals, some of which may be harmful to the environment. Please dispose of used batteries according to your local environmental laws and guidelines.

PCI Card Guide

Tools

The only tool required for this procedure is a Phillips screwdriver.

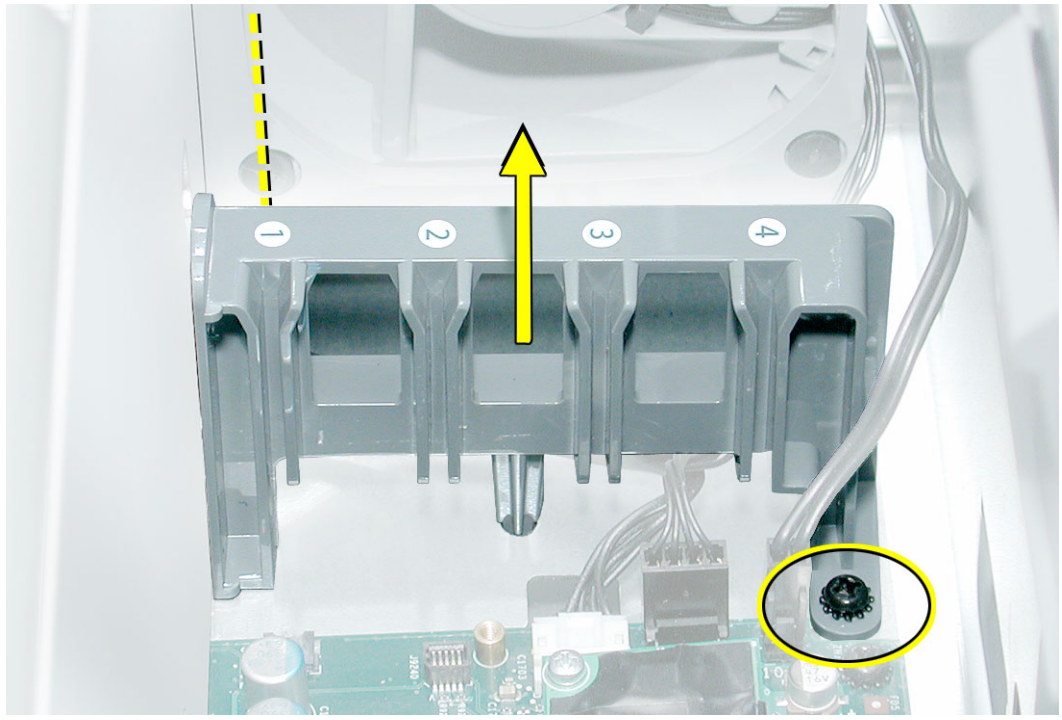
Preliminary Steps

Before you begin, open the computer and lay it on its side with the access side facing up.

Part Location

Procedure

1. Remove the two screws that mount the PCI card guide to the logic board.
2. Slide the card guide up to release the two latches from the PCI divider, and remove the card guide from the enclosure.



Speaker/Fan Assembly

Tools

The only tools required for this procedure are a Phillips screwdriver and needlenose pliers.

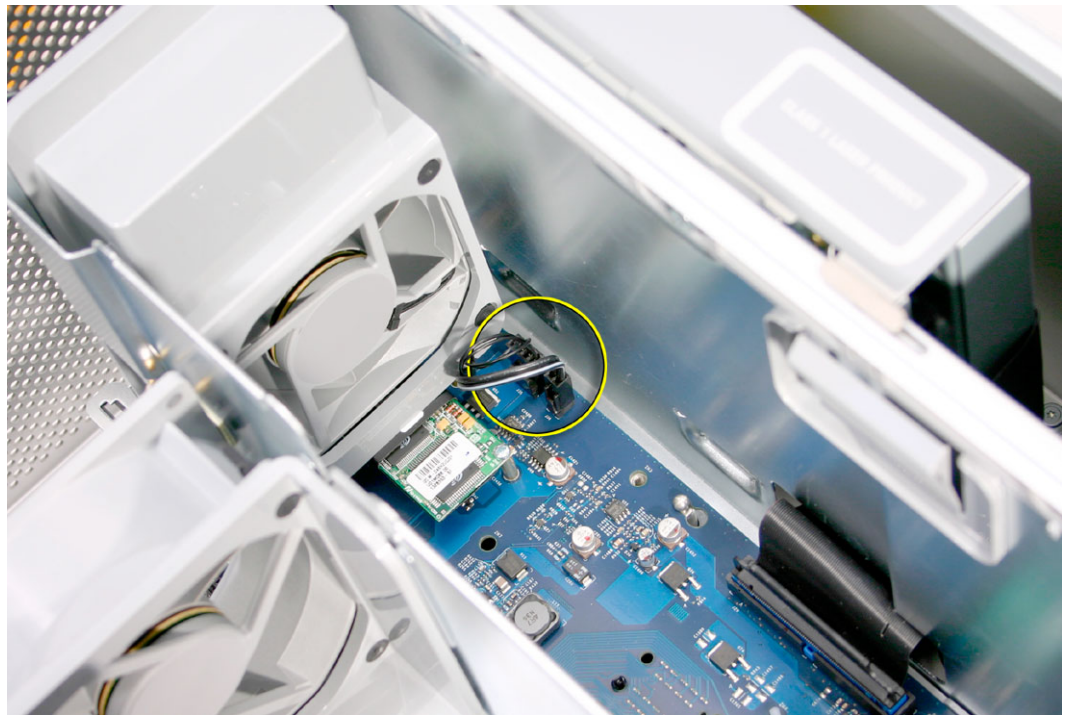
Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the PCI card guide.

Part Location

Procedure

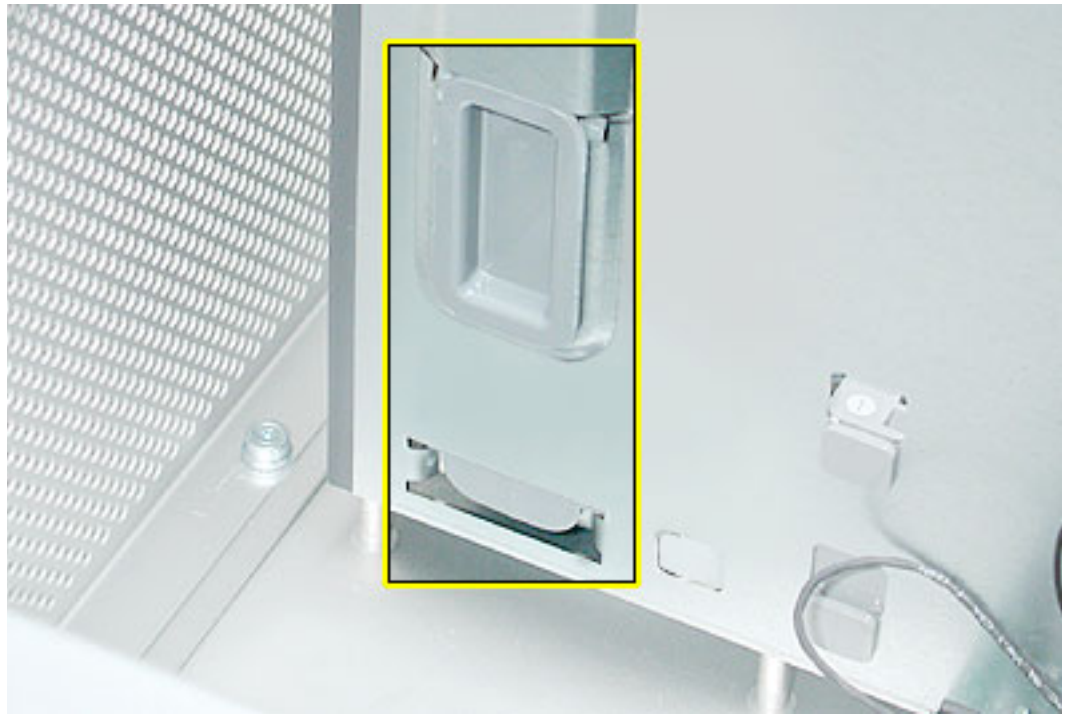
1. Disconnect the speaker and fan cables from the logic board.
2. Lift the speaker/fan assembly straight up and remove it from the enclosure.



3. If you are replacing the speaker, remove the two screws and remove the speaker from the speaker/fan bracket.

4. If you are replacing the fan, use needlenose pliers to pull the fan off the four grommet fasteners. Then remove the fan from the bracket.

Replacement Note: When reinstalling the speaker/fan bracket in the enclosure, make sure the large tab on the side of bracket engages with the channel in the PCI divider.



Heatsink Cover

Warning: The processor, heatsink, and logic board are a unit. Never separate the three, or you will damage the modules and void the warranty. The only parts you may remove from the unit are the heatsink cover and processor inlet frame.

Tools

This procedure requires the following tools:

- Two flat-blade screwdrivers
- Jeweler's flat-blade scewdriver

In addition, you may need the following tools for removing the locking rivet:

- Mat knife or Xacto knife
- Cup hook
- Small wooden stick

Preliminary Steps

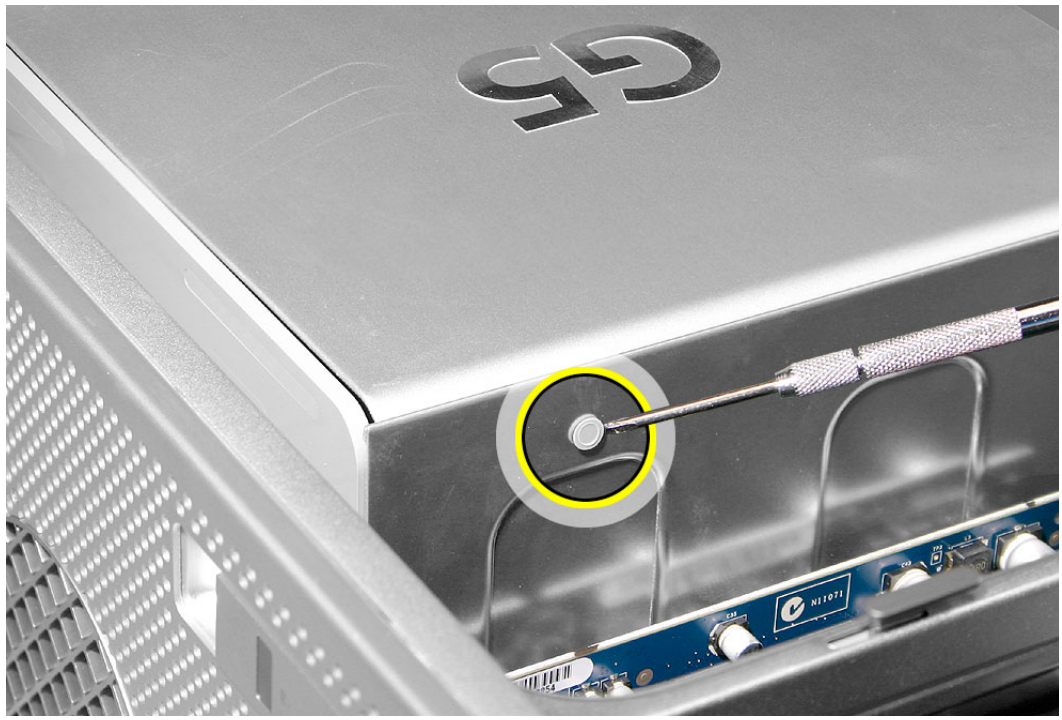
Before you begin, open the computer and lay it on its side with the access side facing up.

Part Location

Procedure

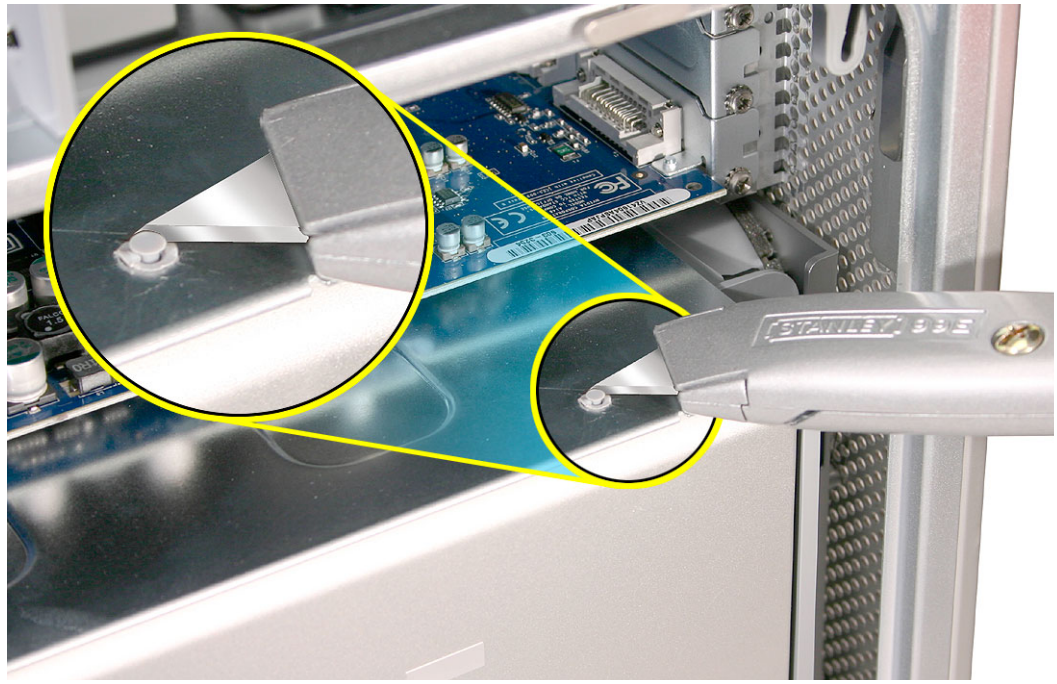
1. Using a jeweler's flat-blade screwdriver, pry up and remove the locking rivet that secures the processor heatsink cover to the PCI divider.

Note: If the rivet does not pry up easily, continue with step 2. Otherwise, skip to step 4.



Replacement Note: You do not need to replace the rivet after you have replaced the heatsink cover.

2. Using a mat knife or Xacto knife, pry up and remove the plug at the center of the locking rivet.



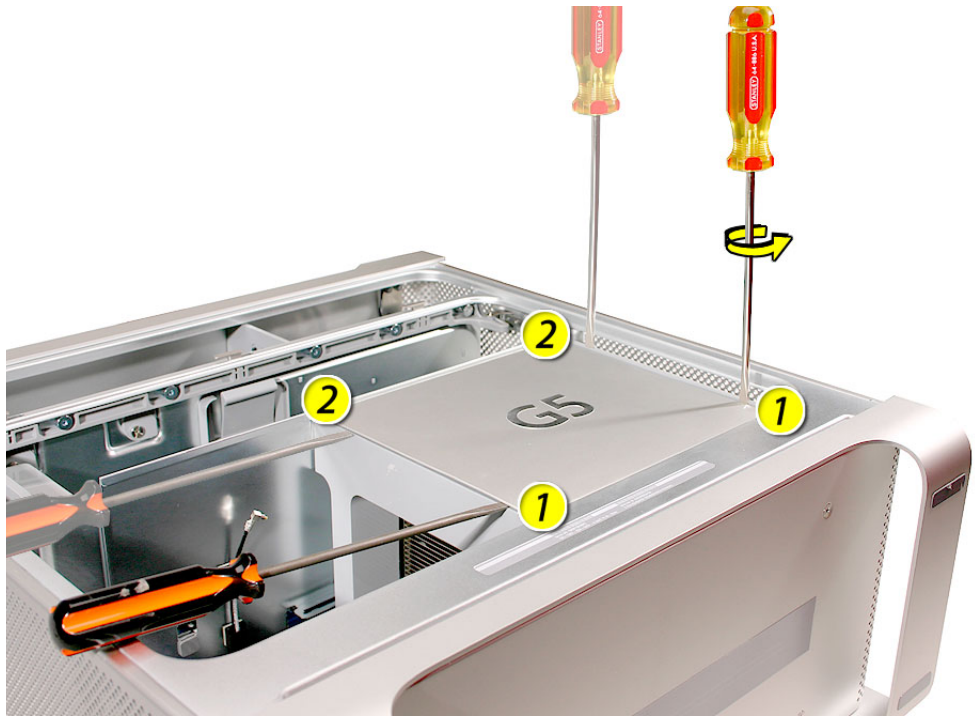
3. Screw a cup hook into the center of the remaining rivet and holding onto the hook, rock the rivet back and forth until you work it out of the heatsink cover. **Note:** You may find it useful to insert a wooden stick into the hook to help pull out the rivet.

Note: The heatsink cover is secured to the computer by three latches below the left side of the cover. The following two steps release the cover from these latches.

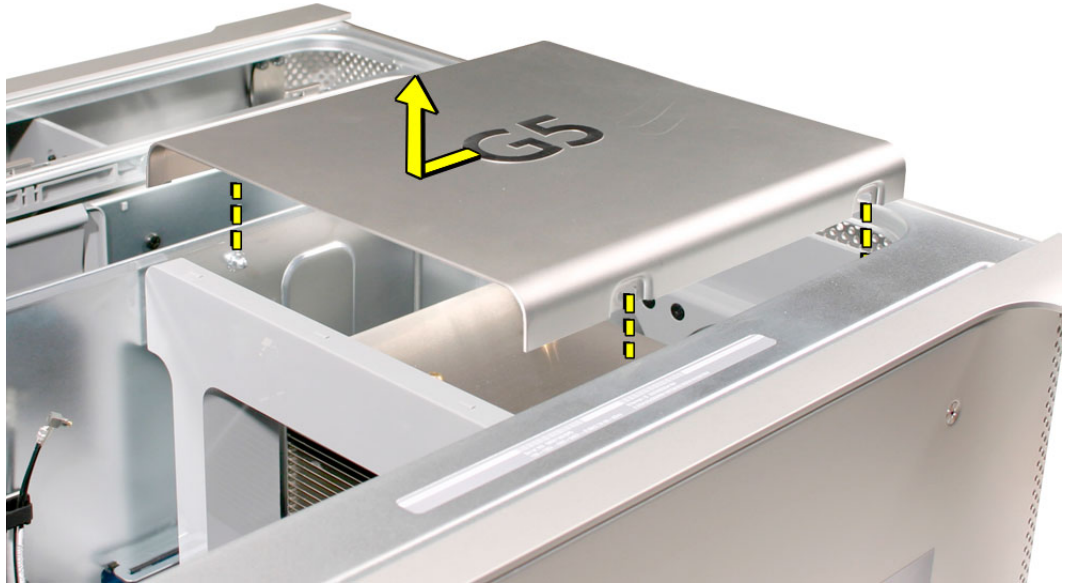
4. Holding a flat-blade screwdriver in each hand, insert the screwdrivers under the heatsink cover at the bottom left and right corners (illustrated below) and lift up slightly.

   Note: As you lift, you may need to twist the screwdriver at the right corner.

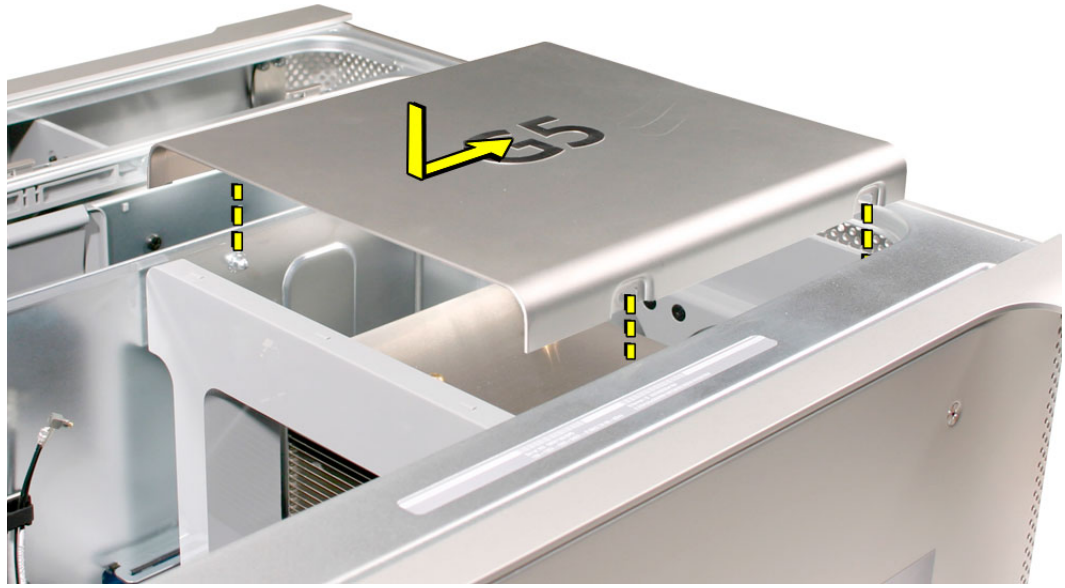
5. Repeat this procedure for the heatsink cover's top left and right corners.



6. Once you feel the latches release, slide the cover to the left a short distance to release it from four metal mounting pegs located under the cover.
7. Lift the cover up and off the heatsink.



Replacement Note: Place the notches in the underside of the cover directly over the four mounting pegs. Slide the cover toward the back of the computer and then press down firmly until you feel the cover lock into place.



Processor Inlet Frame

Warning: The processor, heatsink, and logic board are a unit. Never separate the three, or you will damage the modules and void the warranty. The only parts you may remove from the unit are the heatsink cover and processor inlet frame.

Tools

No tools are required for this procedure.

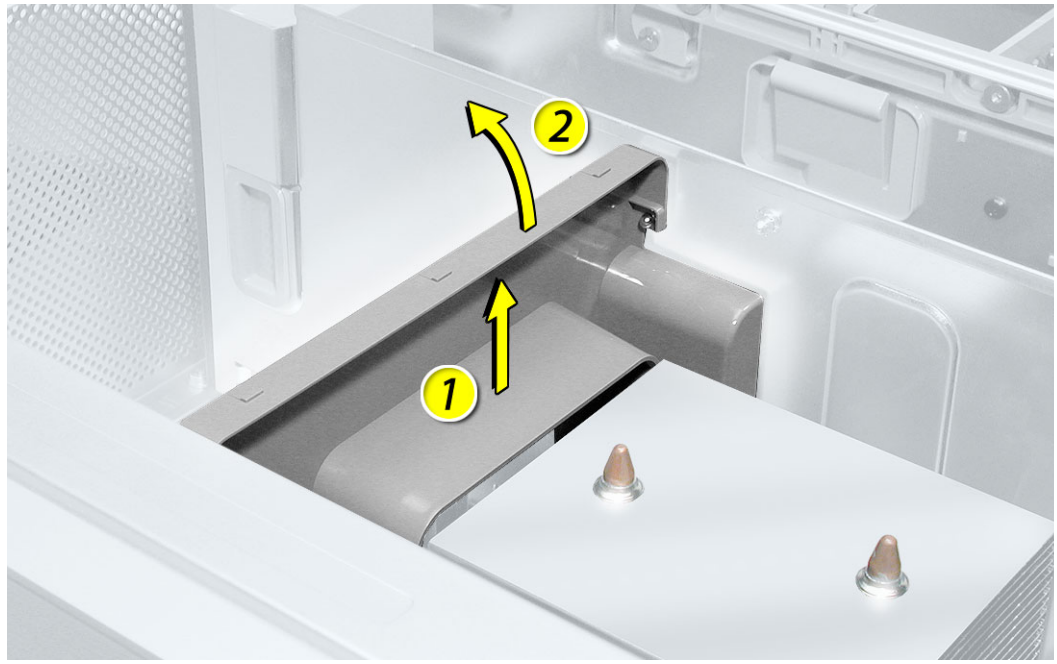
Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the heatsink cover.

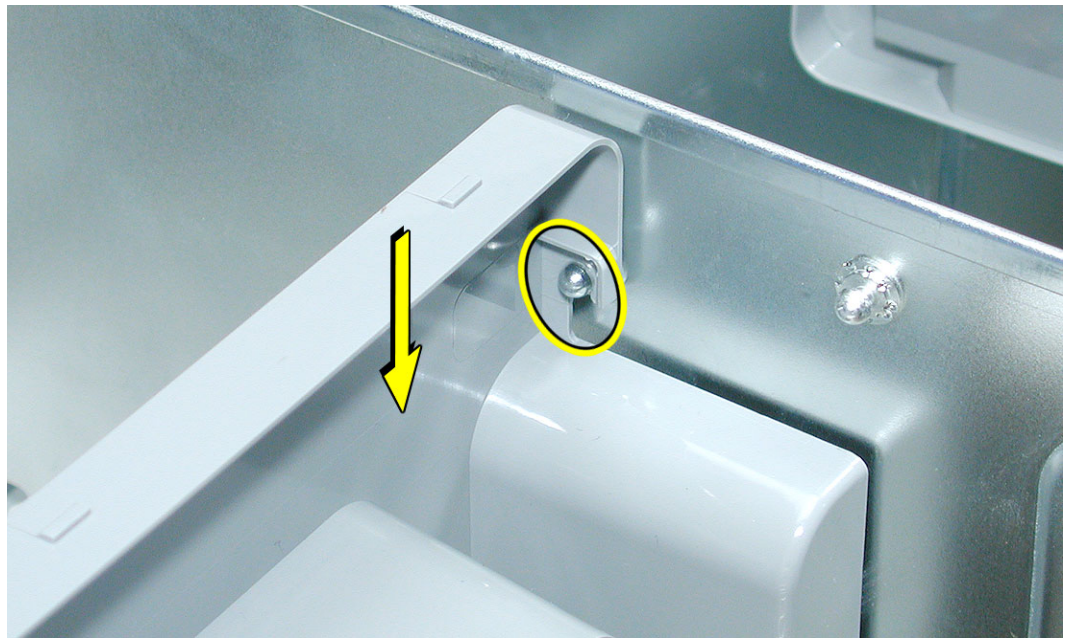
Part Location

Procedure

1. Lift the processor inlet frame straight up a short distance to disengage the openings in the frame from the three mounting pegs in the PCI divider.
2. Tilt the frame back from the heatsink and remove the frame from the enclosure.



Replacement Note: Make sure the inlet frame engages with the mounting pegs on the PCI divider and press down.



Rear Exhaust Fans

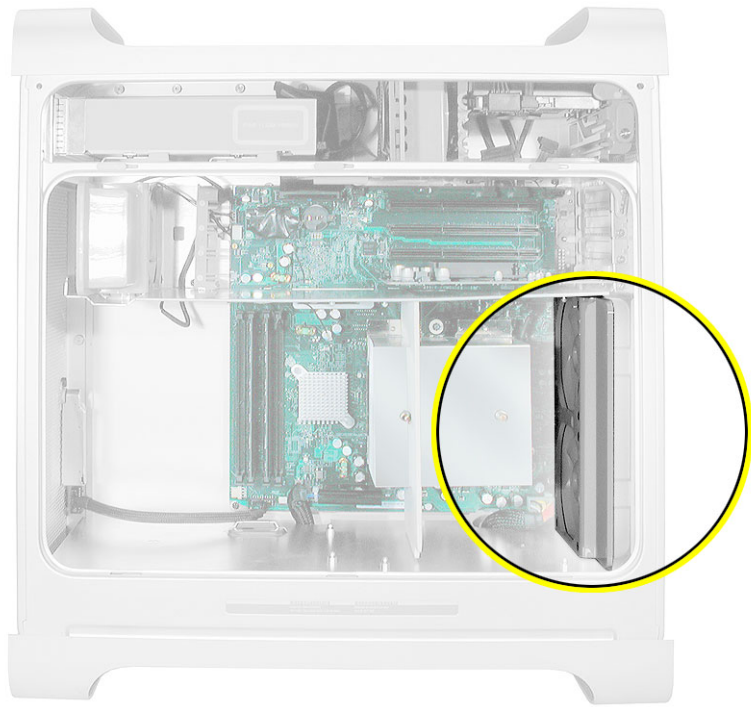
Tools

The only tool required for this procedure is needlenose pliers.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the heatsink cover.

Part Location

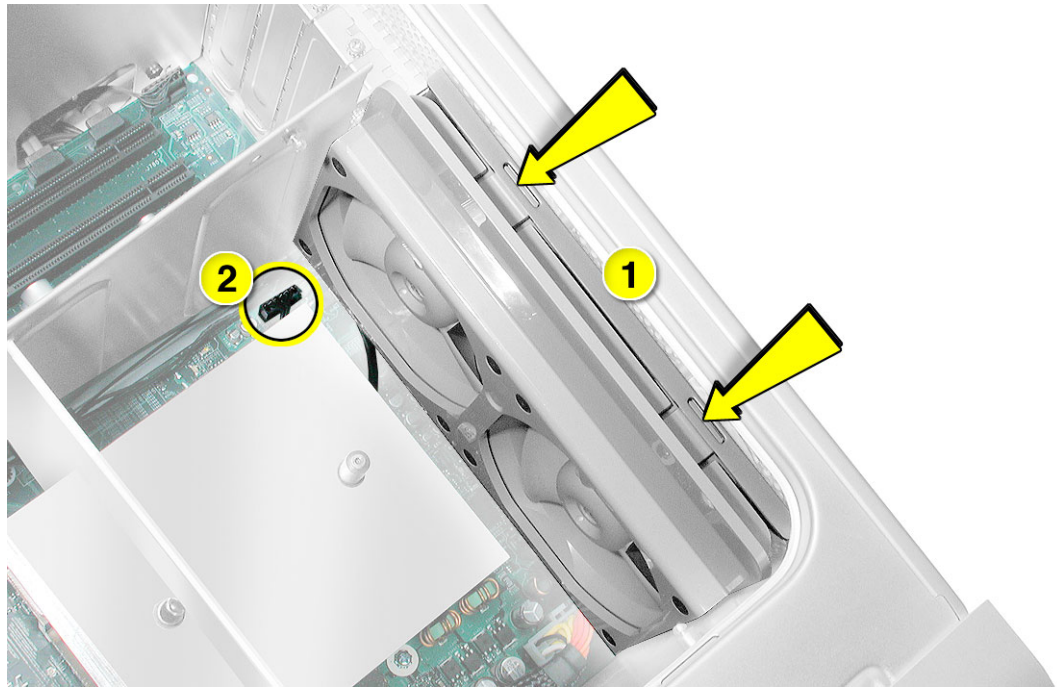


Procedure

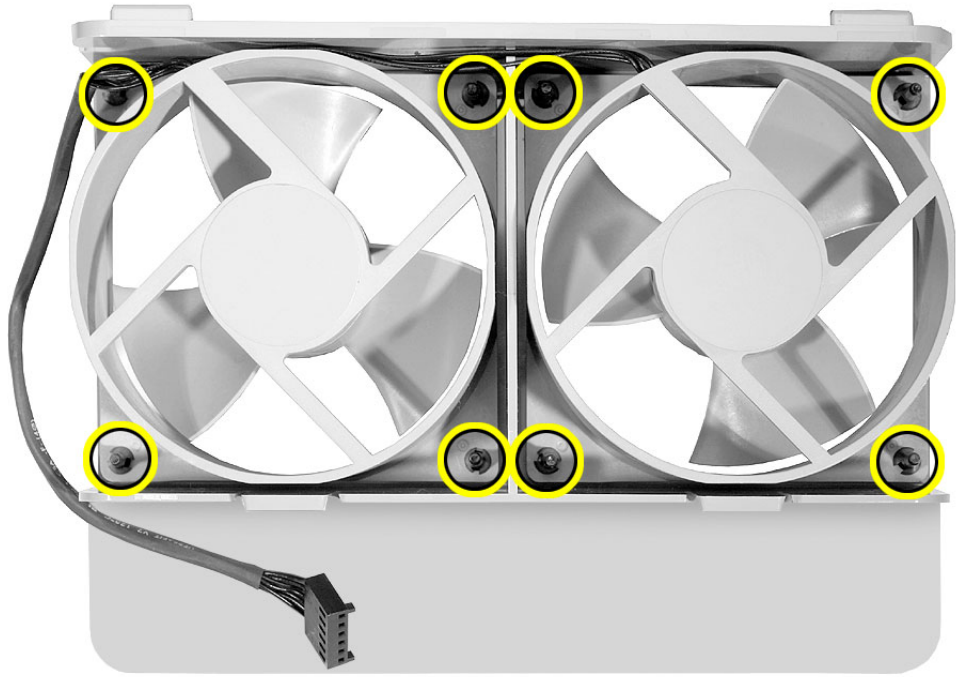
1. Press down on the two tabs on the top of the fan bracket to release the two latches.
2. Lift the fan bracket and fans a short distance out of the enclosure.

   Warning: Lift the bracket only a short distance because the fans are connected to the logic board by a cable. You will disconnect the cable in the next step.
3. Disconnect the fan cable from the logic board and remove the fan assembly from the enclosure.

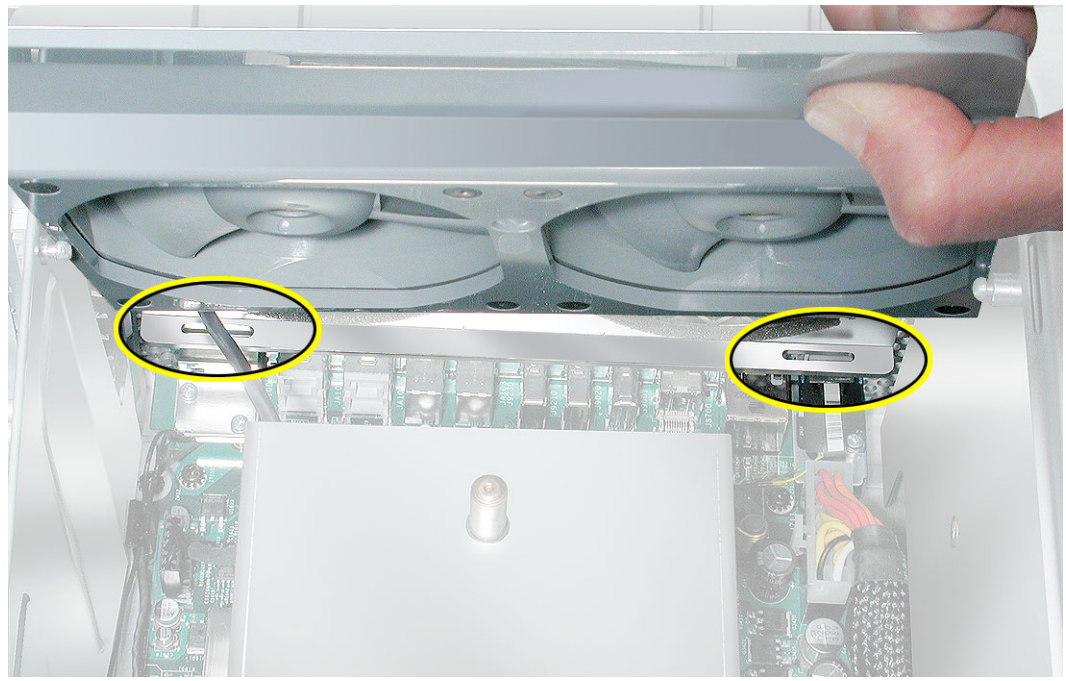
   Note: Press the cable connector up toward the media shelf when disconnecting the cable.



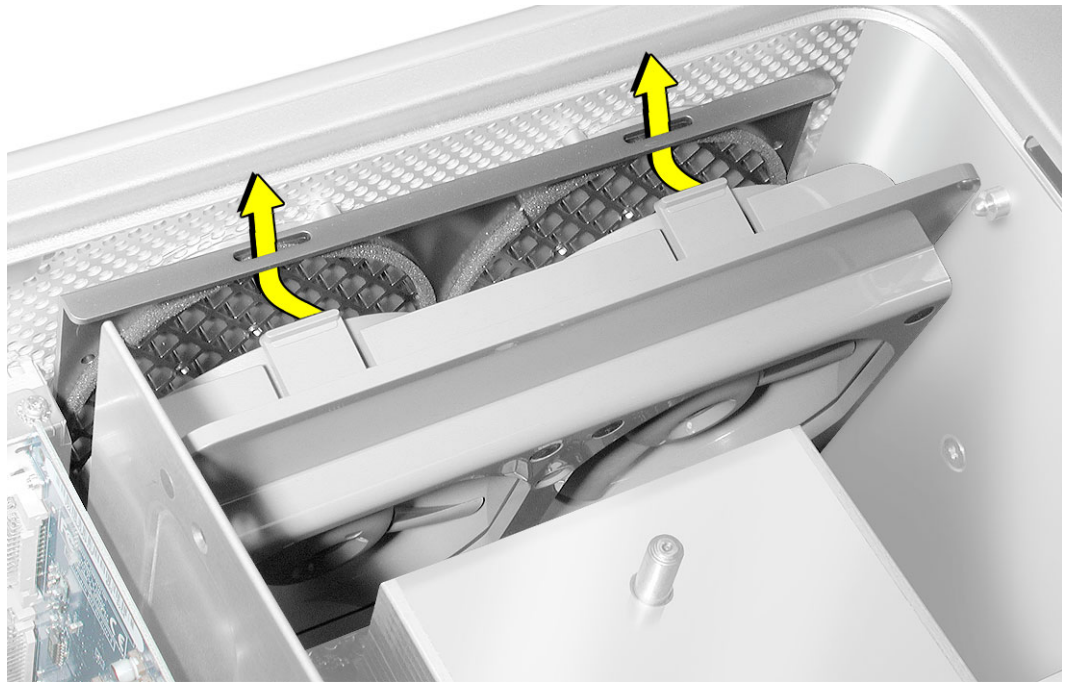
4. If you are replacing the fans, use needlenose pliers to pull each fan off the four grommets that mount it to the bracket, and remove the fans and cable from the bracket.



Replacement Note: When reinstalling the fan bracket in the enclosure, first connect the fan cable to the logic board. Next, insert the two tabs on the bottom of the bracket into the slots in the enclosure's fan guide.



Then rotate the fan back flush with the rear panel, making sure the two latches on the top of the bracket engage with the two slots on the top of the fan guide.



Front Panel Board Cable

Tools

No tools are required for this procedure.

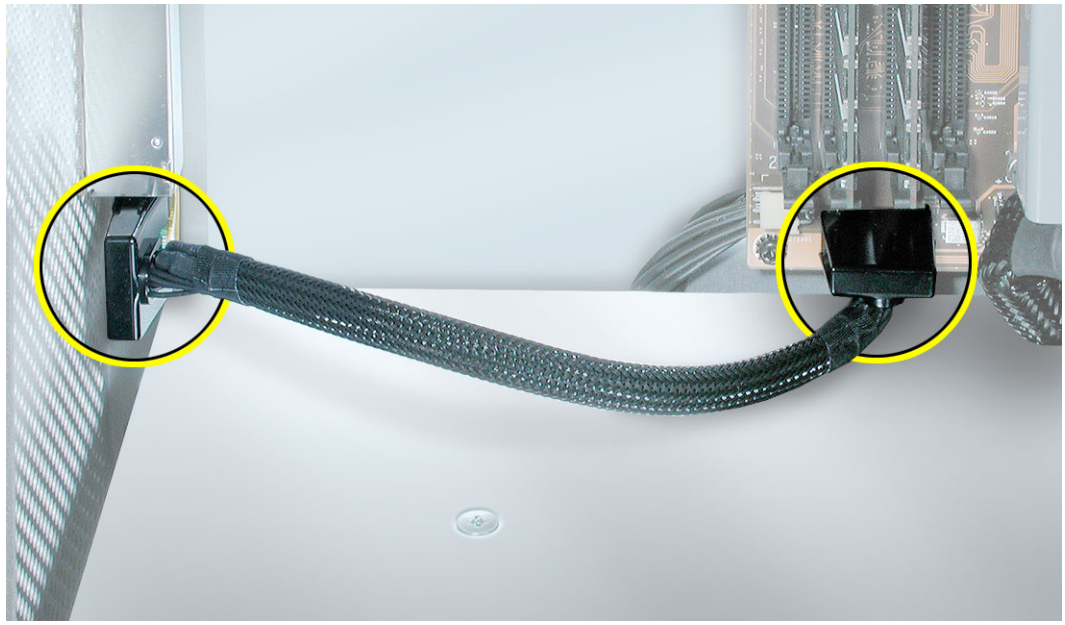
Preliminary Steps

Before you begin, open the computer and lay it on its side with the access side facing up.

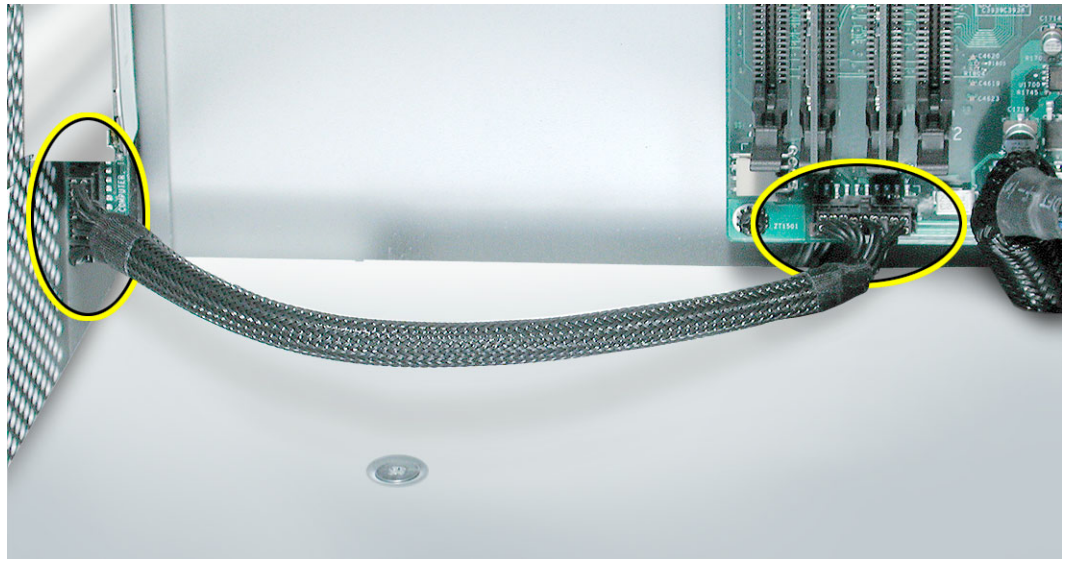
Part Location

Procedure

1. Remove the covers from the connectors on each end of the front panel board cable.



2. Disconnect the cable from the logic board.
3. Disconnect the other end of the cable from the front panel board and remove the cable from the enclosure.



Front Panel Board

Tools

The only tools required for this procedure are a jeweler’s flat-blade screwdriver and a Phillips screwdriver.

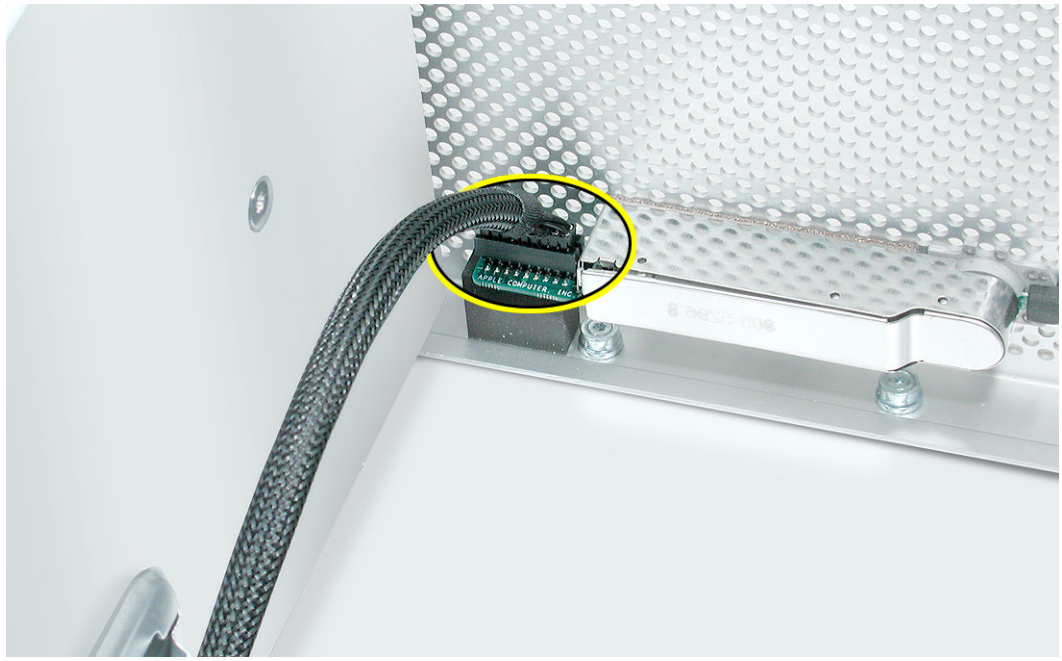
Preliminary Steps

Before you begin, open the computer and lay it on its side with the access side facing up.

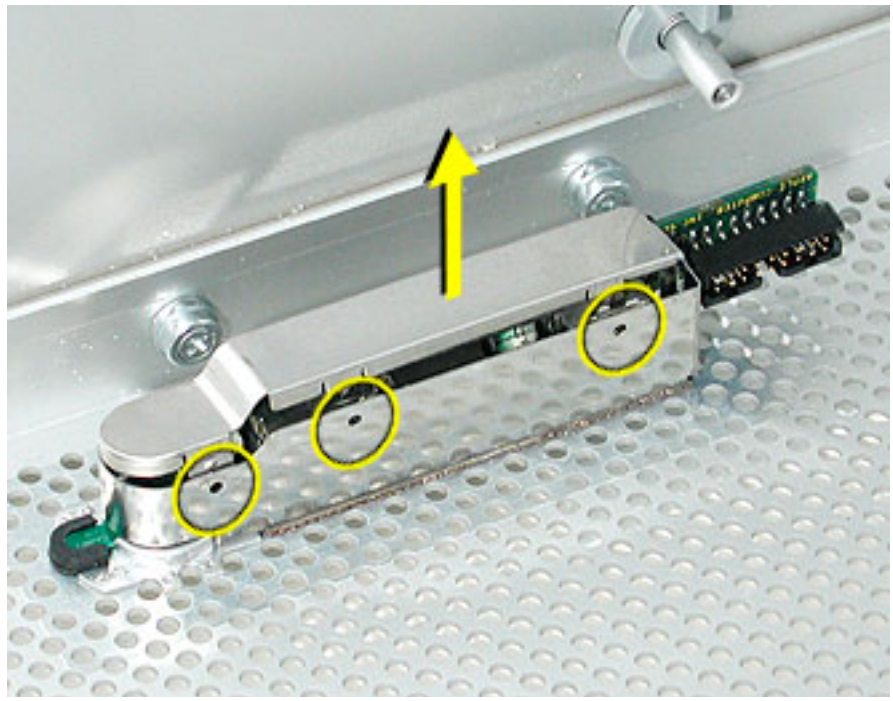
Part Location

Procedure

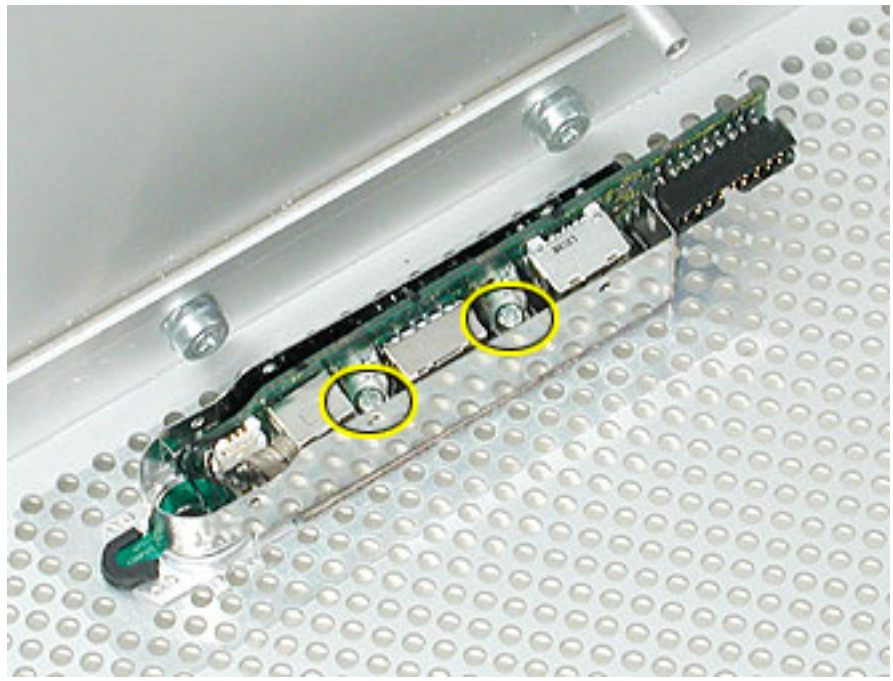
1. Remove the connector cover from the front panel board cable.
2. Disconnect the front panel board cable from the front panel board.



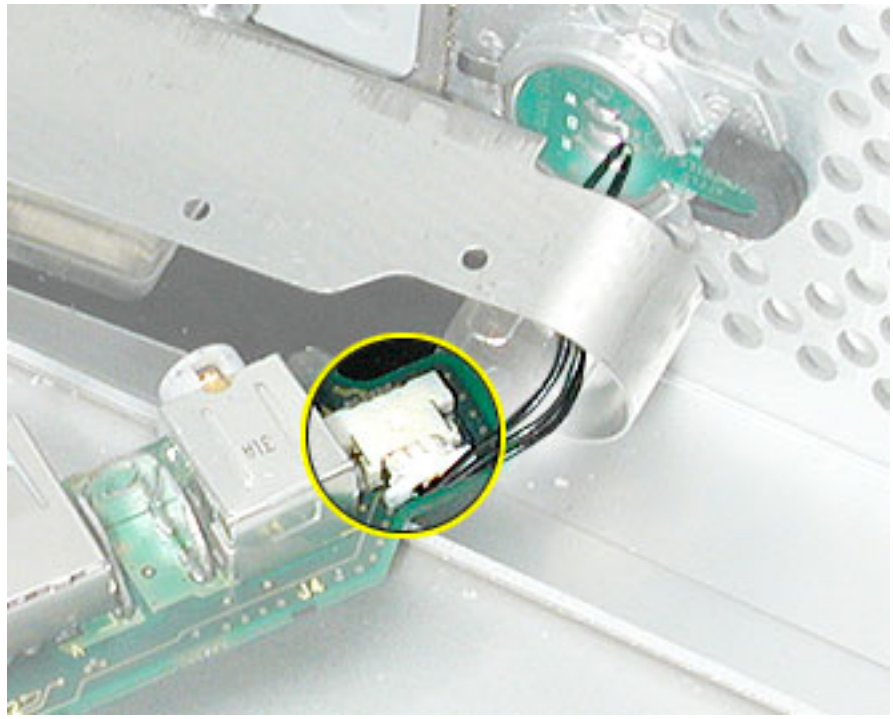
3. Using a jeweler’s flatblade screwdriver, pry up the metal cap covering the front panel board EMI shield.



4. Using a Phillips screwdriver, remove the two front panel board mounting screws.



5. Carefully pull the board a short distance out of its EMI shield, and disconnect the power button cable from the board.
6. Remove the board and shield from the enclosure.

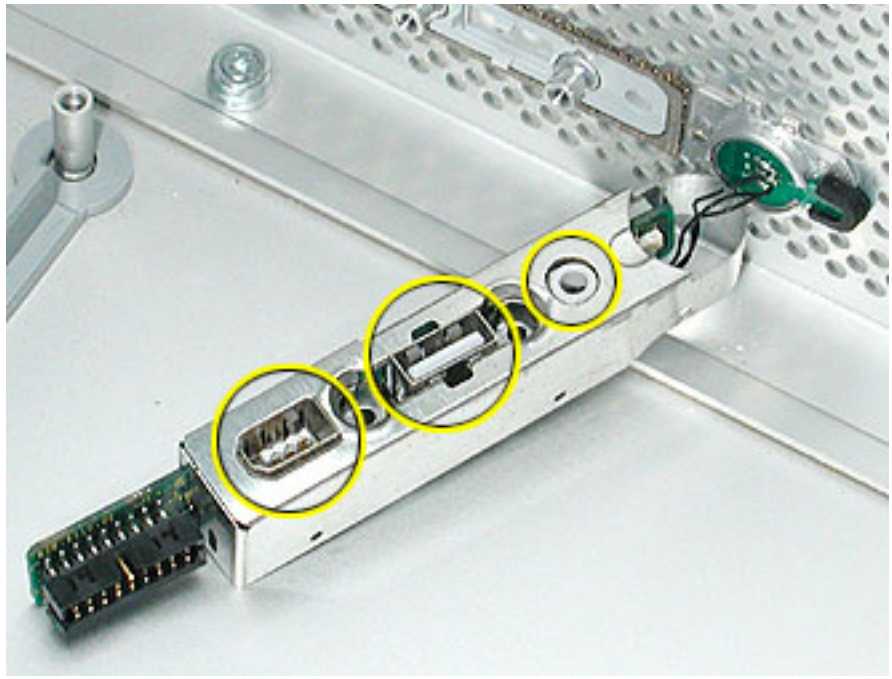


Replacement Procedure

1. If you are replacing the front panel board with a new front panel board, do the following:
   - Peel the backing off the mylar insulation for the EMI shield, and apply the mylar to the side of the shield, as shown.

   - Peel the backing off the EMI shield gasket and apply the gasket to the bottom of the shield, making sure the openings in the gasket align with the shield openings.

2. Thread the power button cable through the opening in the EMI shield and connect the cable to the front panel board.
3. Insert the front panel board into the EMI shield, making sure the ports are fully seated in the openings in the shield.



4. Install the front panel board and EMI shield on the inside front of the enclosure and replace the two mounting screws.
5. Install the metal cap on the EMI shield.

Power Button

Tools

The only tool required for this procedure is a jeweler’s flat-blade screwdriver.

Preliminary Steps

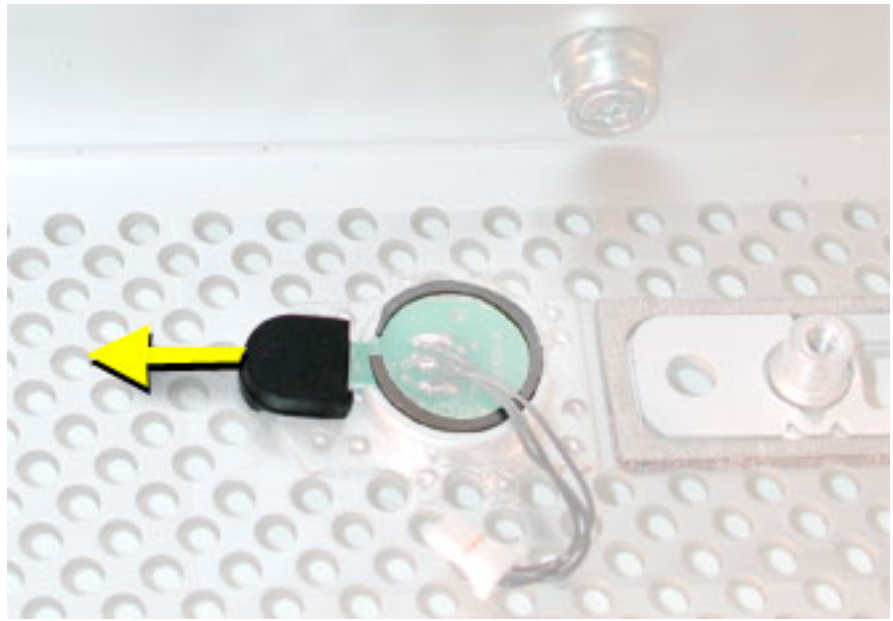
Before you begin, open the computer, lay it on its side with the access side facing up, and remove the front panel board

Part Location

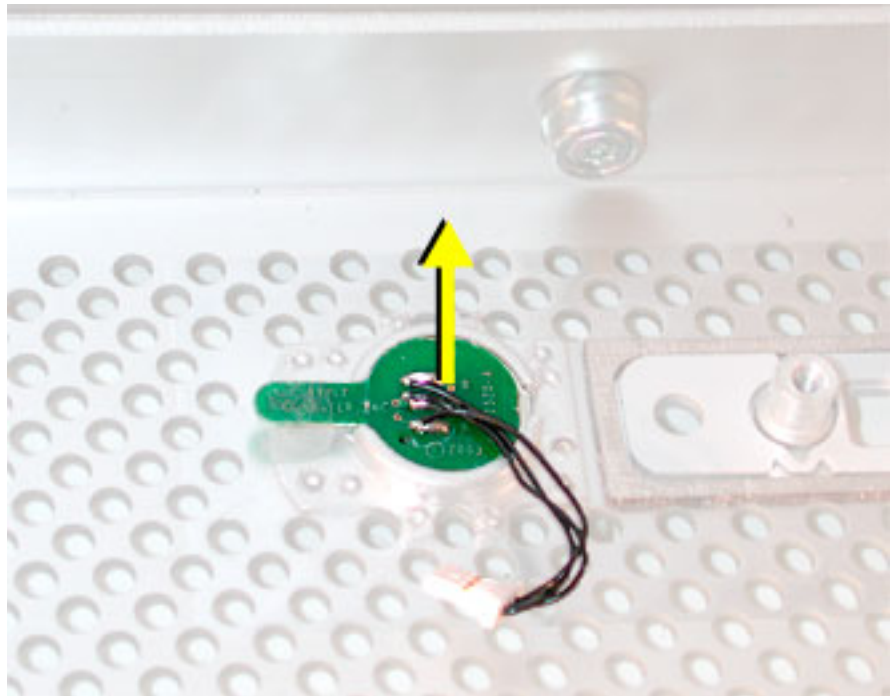
Note: The power button is located under the front panel board.

Procedure

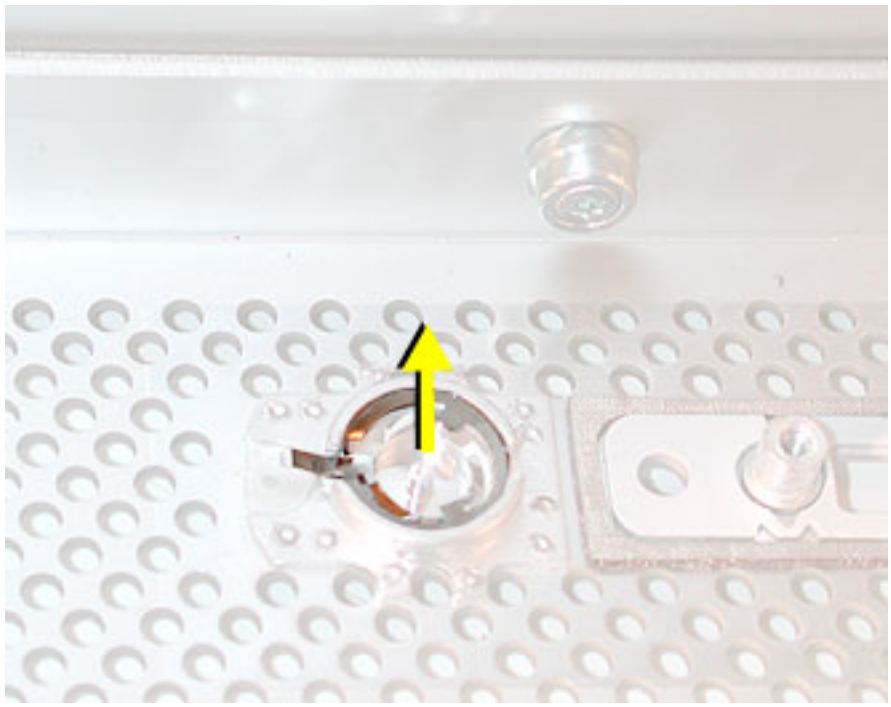
1. Lay the computer so that the front panel is facing down.
2. Remove the black rubber cap that covers the power button LED.
3. Using a flat-blade jeweler's screwdriver, pry up the metal C-ring that secures the power button board.



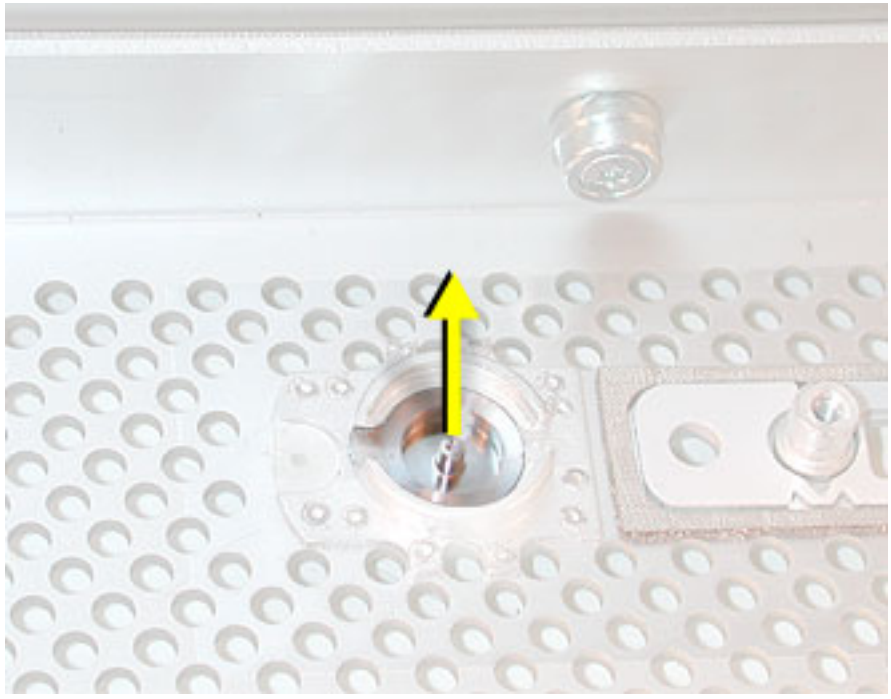
4. Lift up and remove the power button board.



5. Remove the metal activation ring that lies below the power button board.



6. Remove the power button from the enclosure.



Media Bay Sensor Board

Tools

The only tool required for this procedure is a flat-blade screwdriver.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the hard drive(s).

Part Location

Procedure

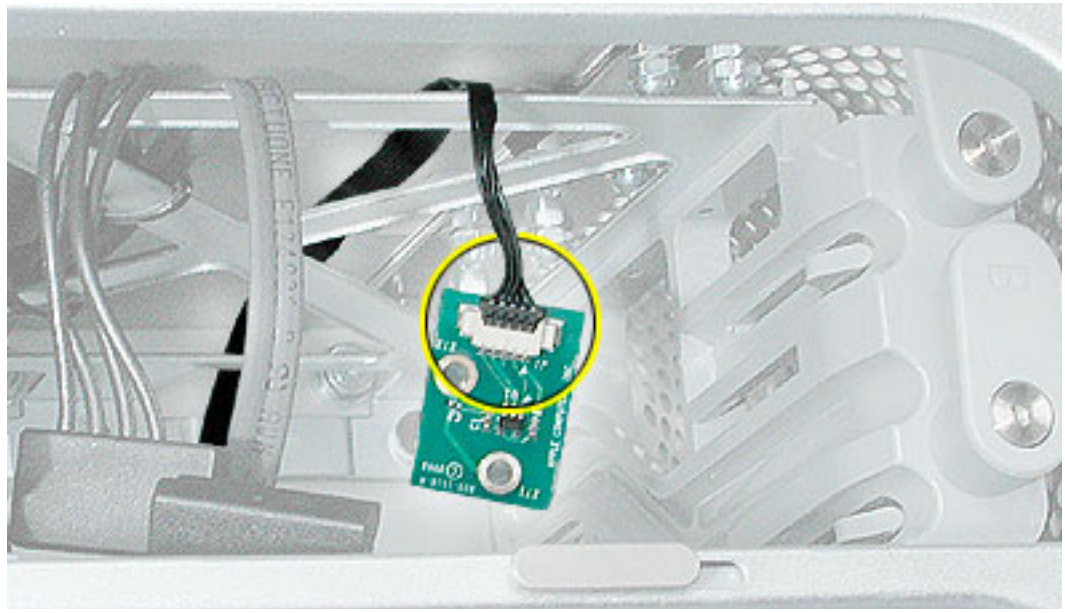
1. Using a flat-blade screwdriver, carefully pry the sensor board from the frame.

   Note: Double-stick tape on the back of the board attaches it to the frame.

2. Pull the board forward slightly so that you can reach the cable connector.

   Note: The board's cable may be taped to the frame and therefore offer some resistance. Carefully tug on the cable to release it.

3. Disconnect the media sensor board cable from the board, and remove the board from the enclosure.



Replacement Note: Before installing the replacement board, apply the double-stick tape included in the sensor board kit to the back of the board. Then reconnect the media sensor board cable and press the board to the frame in the location illustrated below.

PCI Divider

Tools

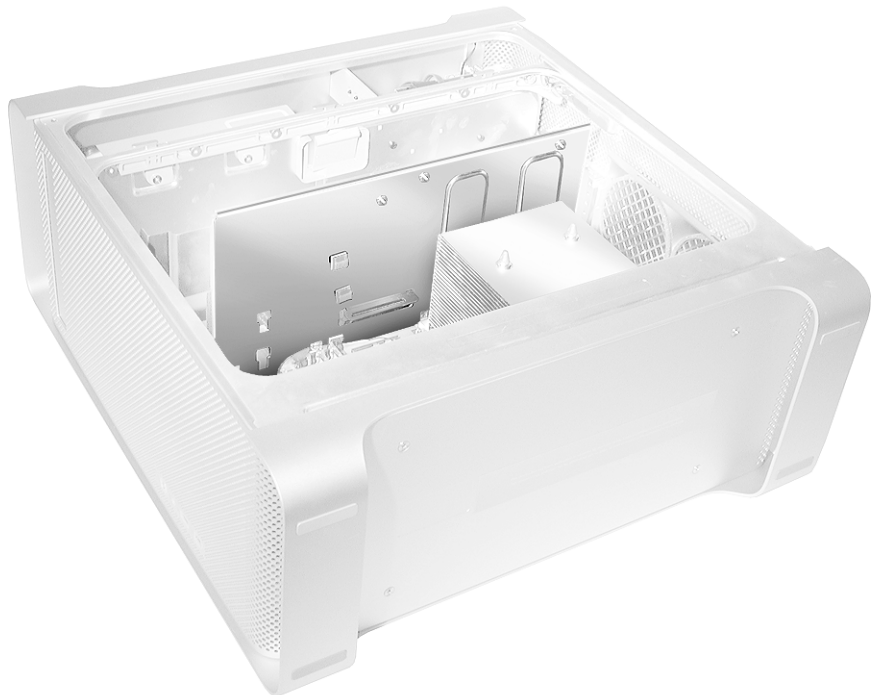
The only tool required for this procedure is a Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:

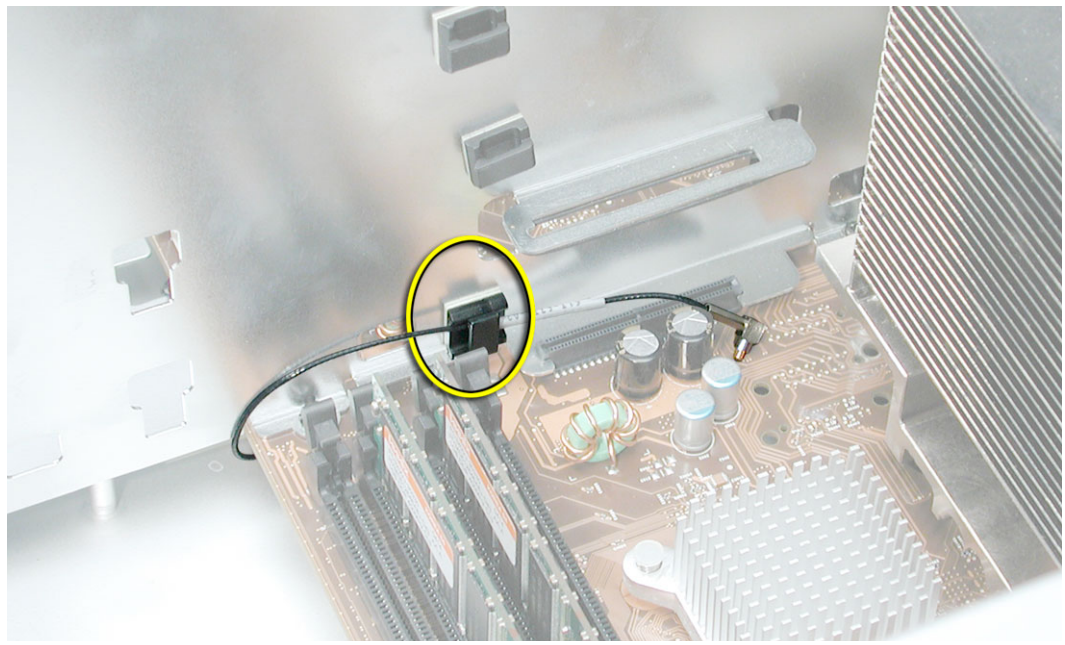
- All AGP and PCI cards
- Airport Extreme Card (if installed)
- Heatsink cover
- Processor inlet frame
- PCI card guide
- Speaker/fan assembly
- Heatsink cover
- Rear exhaust fan assembly

Part Location

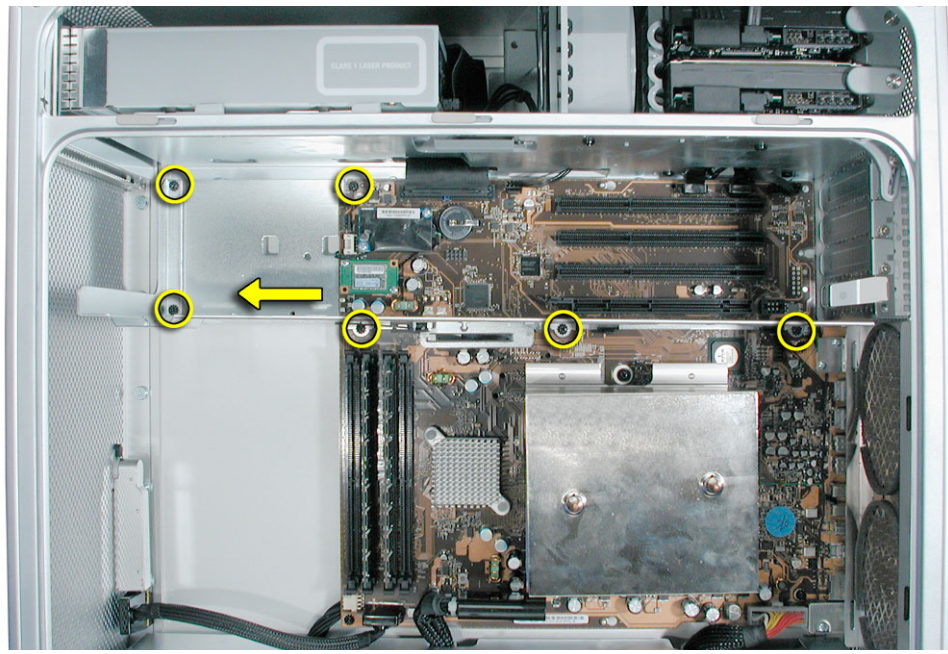


Procedure

1. If no Airport Extreme Card or Bluetooth card was installed in the computer, disconnect their cables from the clips on the PCI divider.
2. Disconnect the modem filter cable from the clip on the PCI divider.



3. Remove the three black mounting screws above the PCI divider and the three black mounting screws below the PCI divider.
4. Slide the PCI divider from under the logic board and remove it from the enclosure.



Logic Board

Tools

The only tool required for this procedure is a Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:

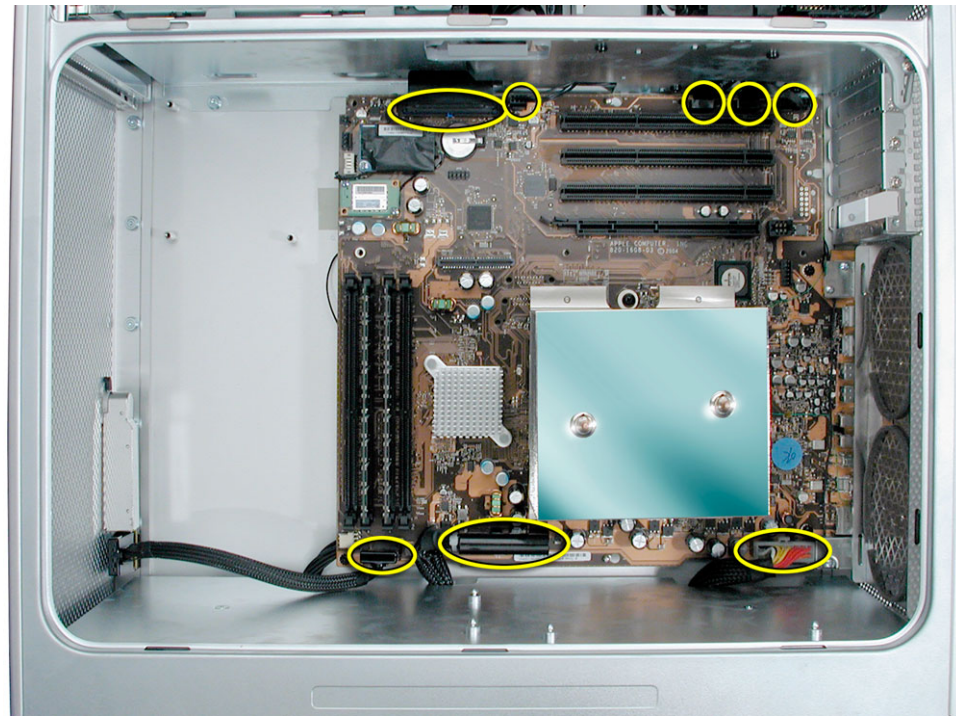
- All AGP and PCI cards
- Airport Extreme Card (if installed)
- PCI card guide
- Speaker/fan assembly
- Heatsink cover
- Processor inlet frame
- Rear exhaust fan assembly
- PCI divider

Part Location

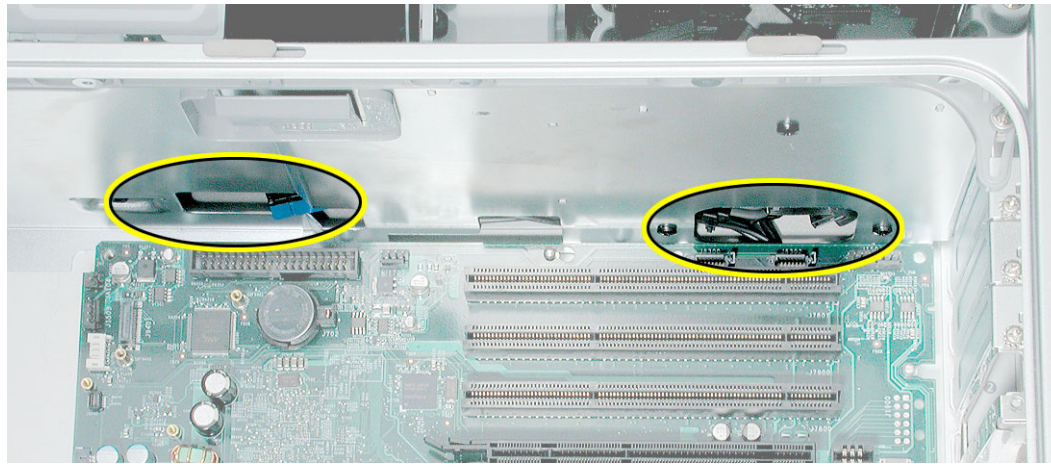
Procedure

Important: The processor/heatsink is part of the logic board and must not be removed separately. Remove and replace the logic board and processor as a unit.

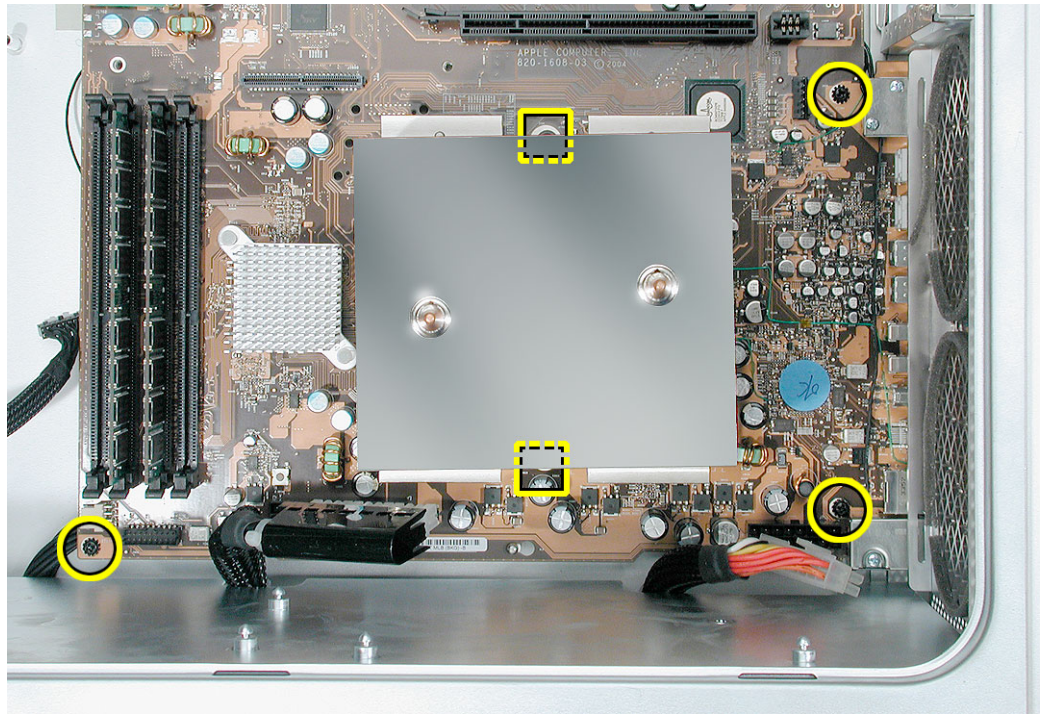
1. Disconnect the five cables from the top of the logic board.
2. Disconnect the two power supply cables and the front panel board cable from the bottom of the logic board.



3. Move the cables at the top of the logic board out of the way by temporarily tucking them into the openings in the media bay shelf.

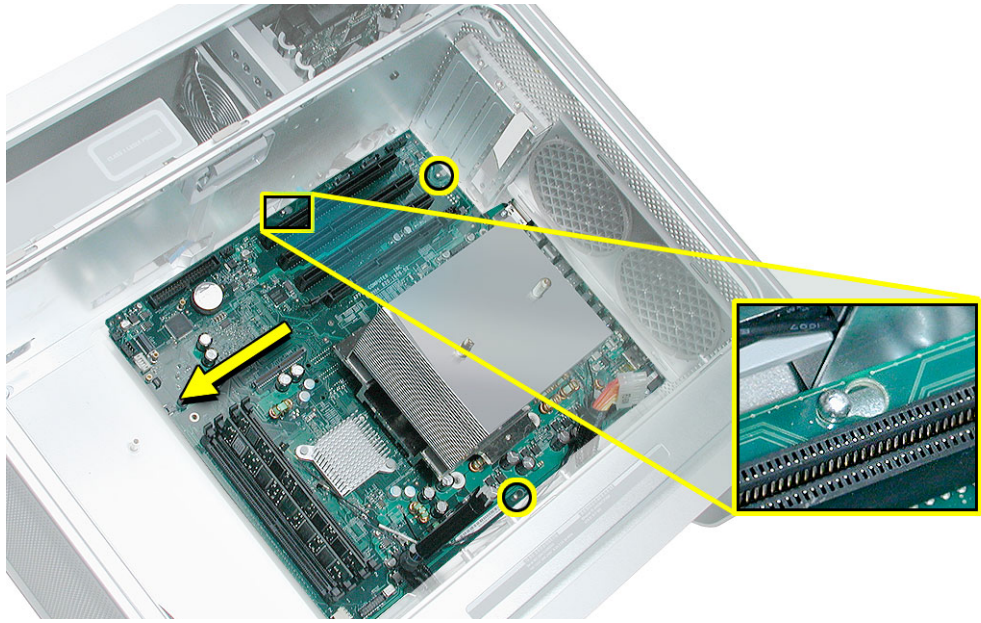


4. Remove the three black logic board mounting screws (indicated by the circles) and the two large black processor mounting screws (indicated by the squares).



5. Slide the logic board to the left and then lift a short distance straight up to disengage the board from its three mounting posts. Slide and lift the logic board by holding onto the board's edges, never the processor.

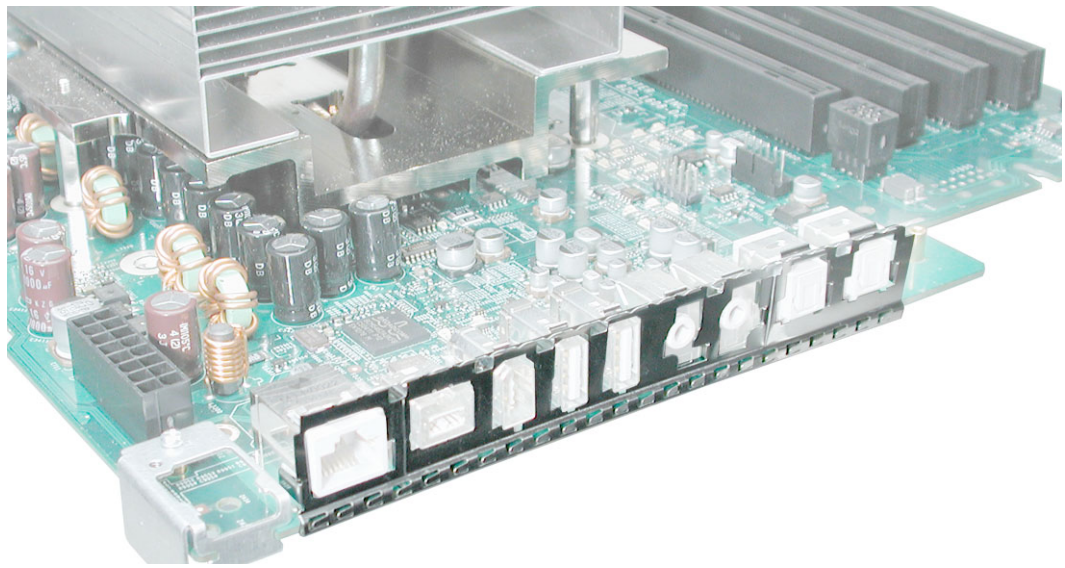
   Note: Make sure the logic board ports clear the openings in the enclosure.



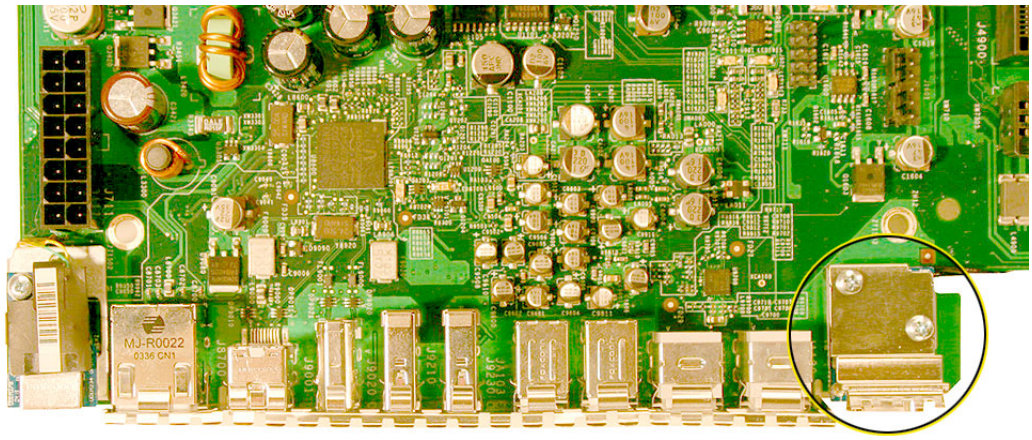
6. Carefully tilt the front edge of the logic board up and maneuver the board out of the enclosure. Place the board on an ESD-safe surface with the processor facing up.

Note: Perform the next steps only if you are replacing the logic board with a new board.

7. Transfer the following from the original logic board to the replacement logic board (see individual procedures earlier in this chapter for detailed steps):
   - Memory DIMMs
   - Modem (if installed)
   - Bluetooth card (if installed)
8. Transfer the port EMI shield from the original logic board to the replacement logic board, making sure the shield is fully seated on the ports.



Replacement Note: When installing the logic board into the computer, make sure the antenna board shield is not bent back away from the case. The shield should touch the case when the logic board is fully installed.



Modem Filter Board and Cable

Tools

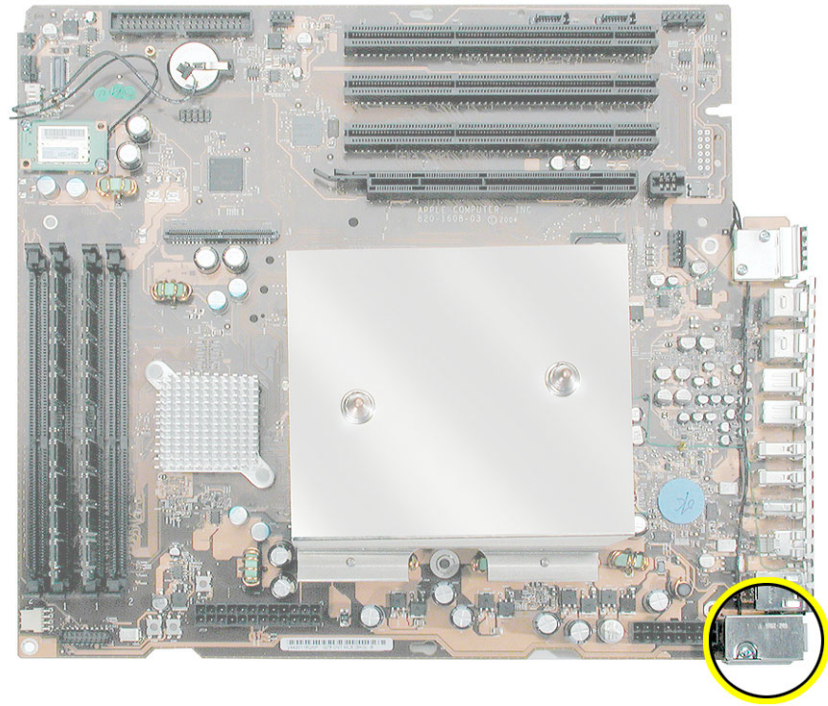
The only tool required for this procedure is a Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:

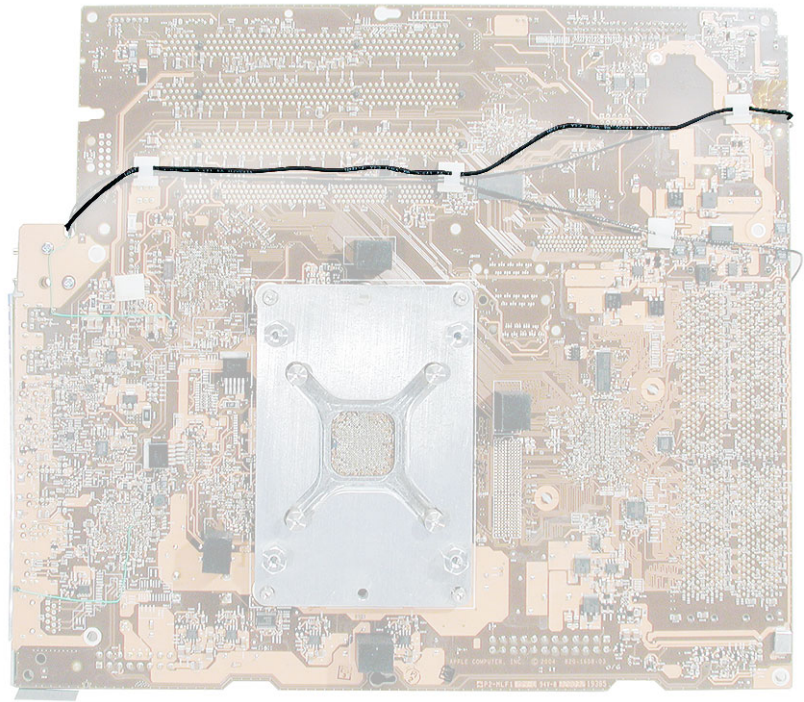
- Modem (if installed)
- All AGP and PCI cards
- Airport Extreme Card (if installed)
- PCI card guide
- Speaker/fan assembly
- Heatsink cover
- Processor inlet frame
- Rear exhaust fan assembly
- PCI divider
- Logic board

Part Location

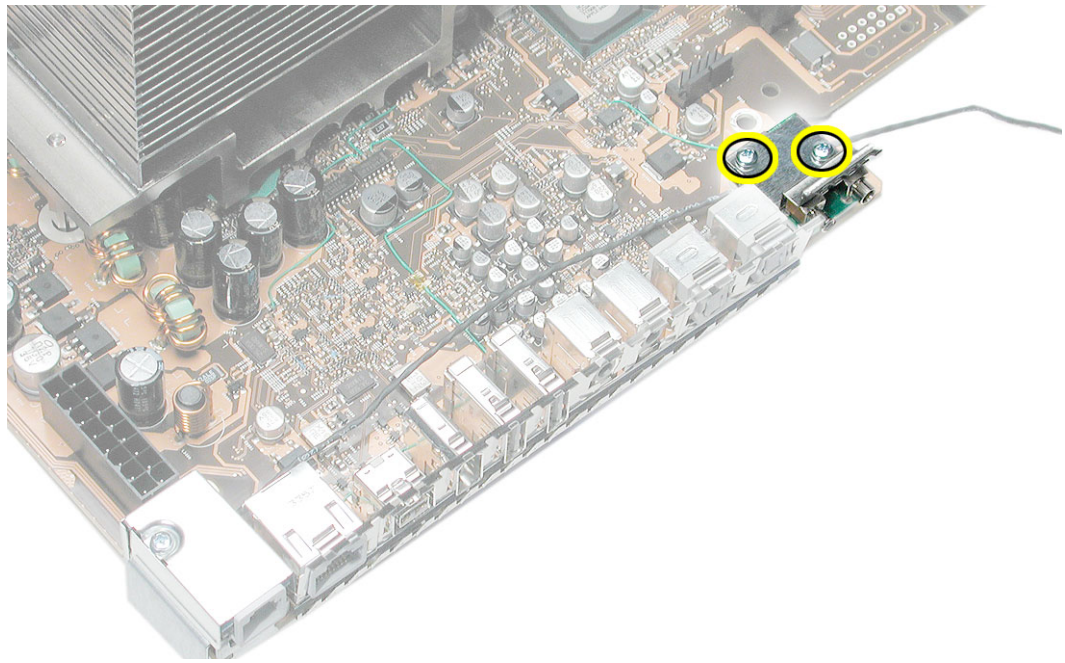


Procedure

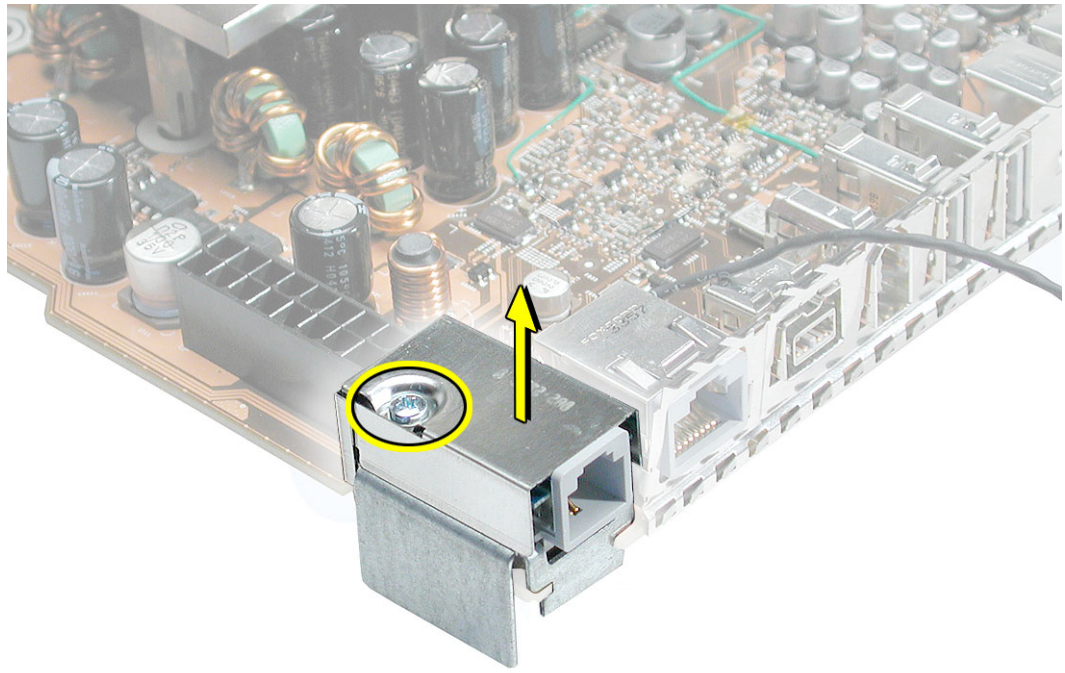
1. Remove the modem cable from the clips on the underside of the logic board.



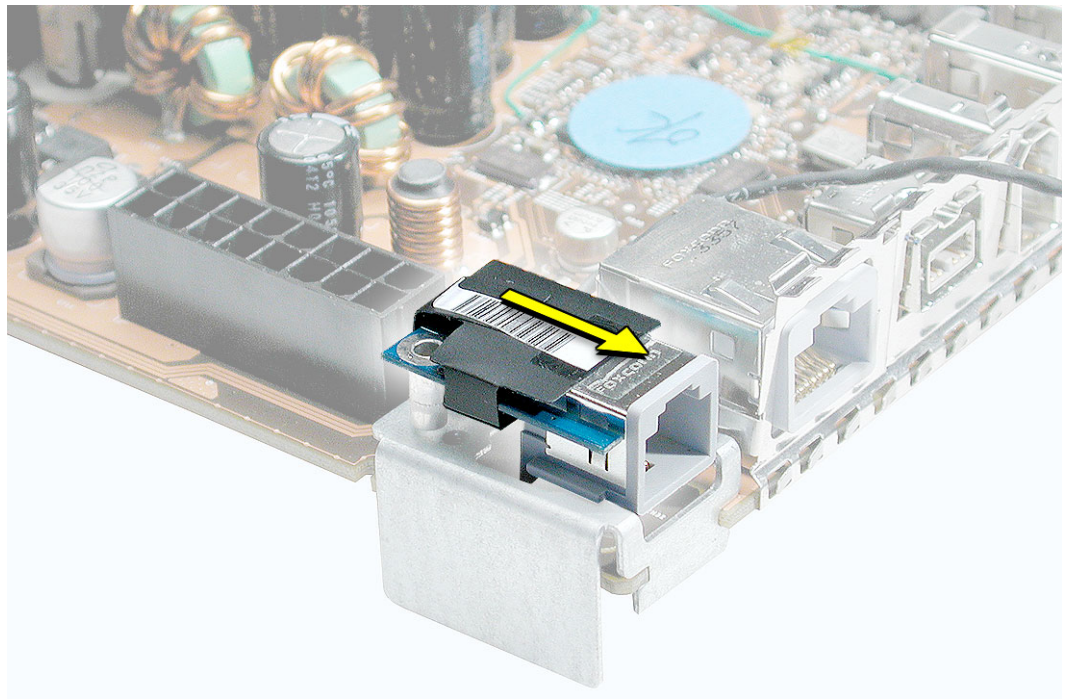
2. Remove the two screws that secure the antenna board, lift the board, and remove the modem cable from underneath the board.



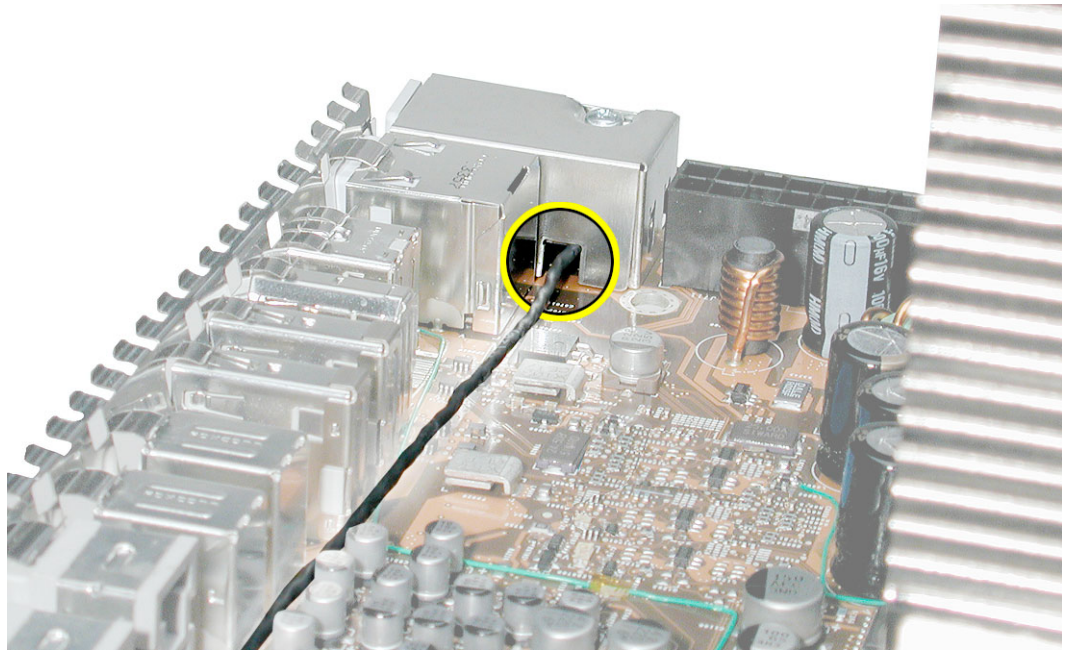
3. Remove the mounting screw on the modem filter board cap and remove the cap.



4. Slide the modem filter board back to disengage it from its mounting bracket, and remove the board and cable from the logic board.



Replacement Note: Make sure the modem filter cable routes out through the opening in the side of the modem filter cap before securing the cap to the modem filter board.



Antenna Board and Cables

Tools

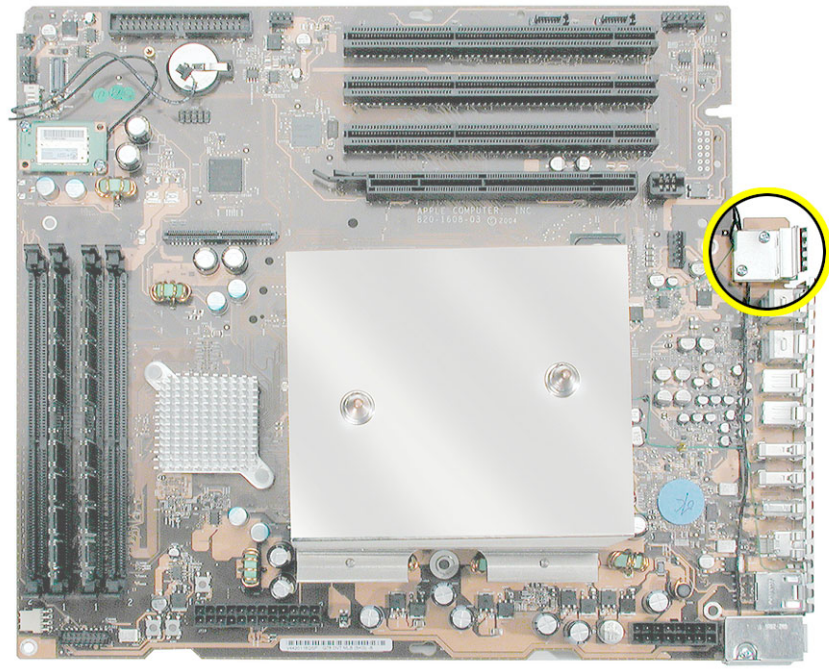
The only tools required for this procedure is a Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:

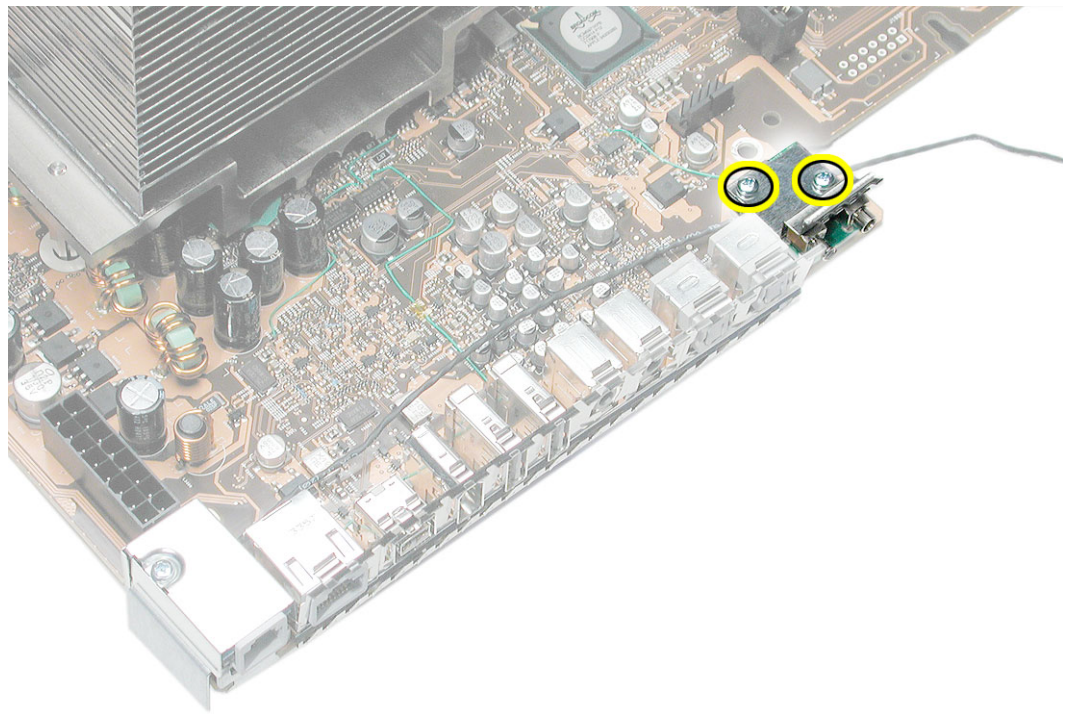
- All AGP and PCI cards
- Airport Extreme Card (if installed)
- PCI card guide
- Speaker/fan assembly
- Heatsink cover
- Processor inlet frame
- Rear exhaust fan assembly
- PCI divider
- Logic board

Part Location

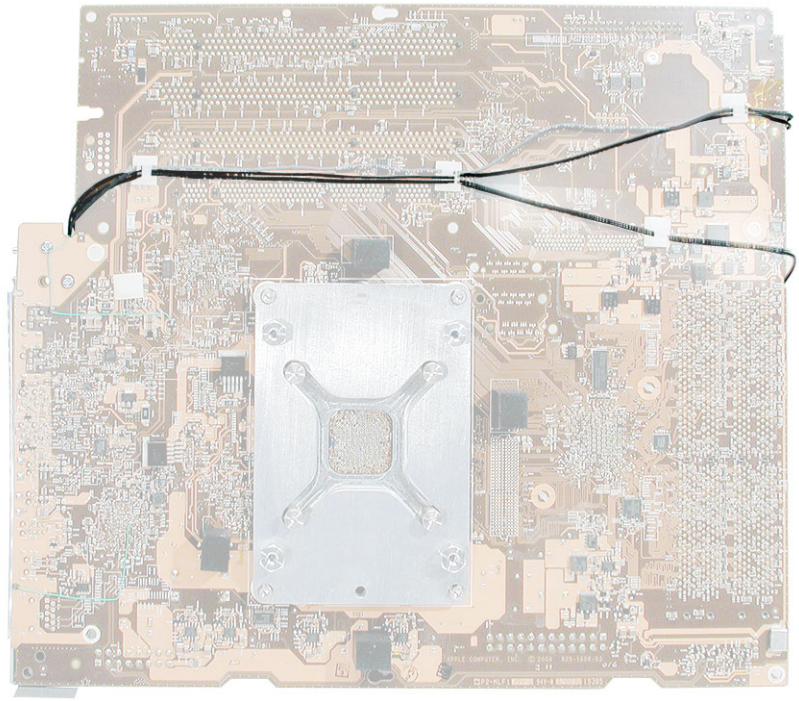


Procedure

1. Remove the two antenna board mounting screws.



2. Remove the Bluetooth cable (gray) and AirPort cable (black) from the clips on the underside of the logic board.
3. Remove the antenna board and cables from the logic board.



Power Supply

Tools

The only tool required for this procedure is a Phillips screwdriver.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:

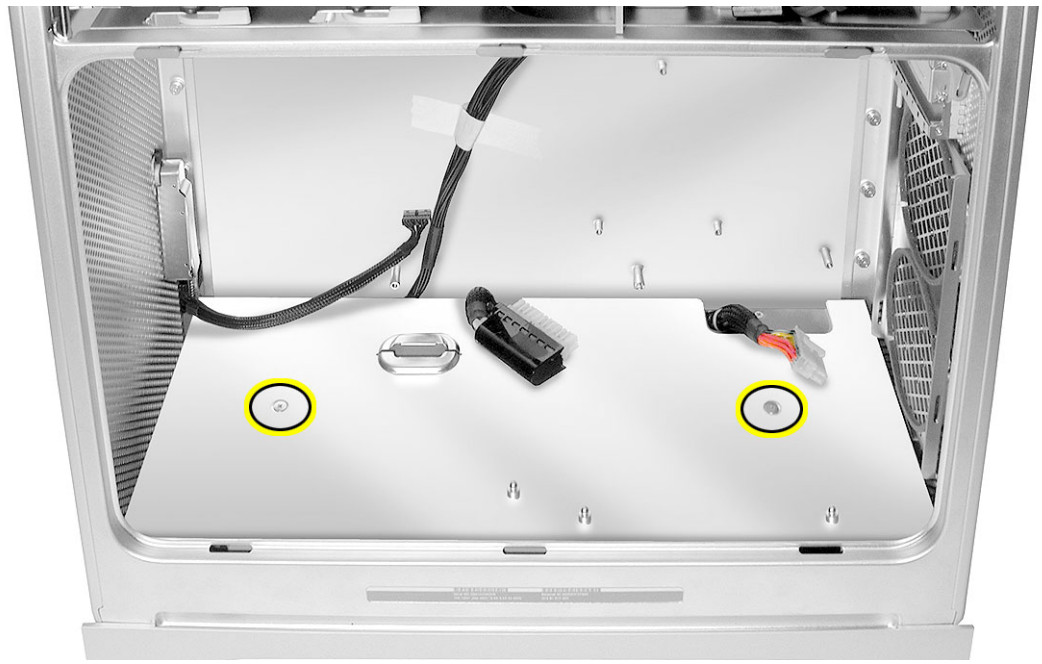
- All AGP and PCI cards
- Airport Extreme Card (if installed)
- PCI card guide
- Speaker/fan assembly
- Heatsink cover
- Processor inlet frame
- Rear exhaust fan assembly
- PCI divider
- Logic board

Part Location

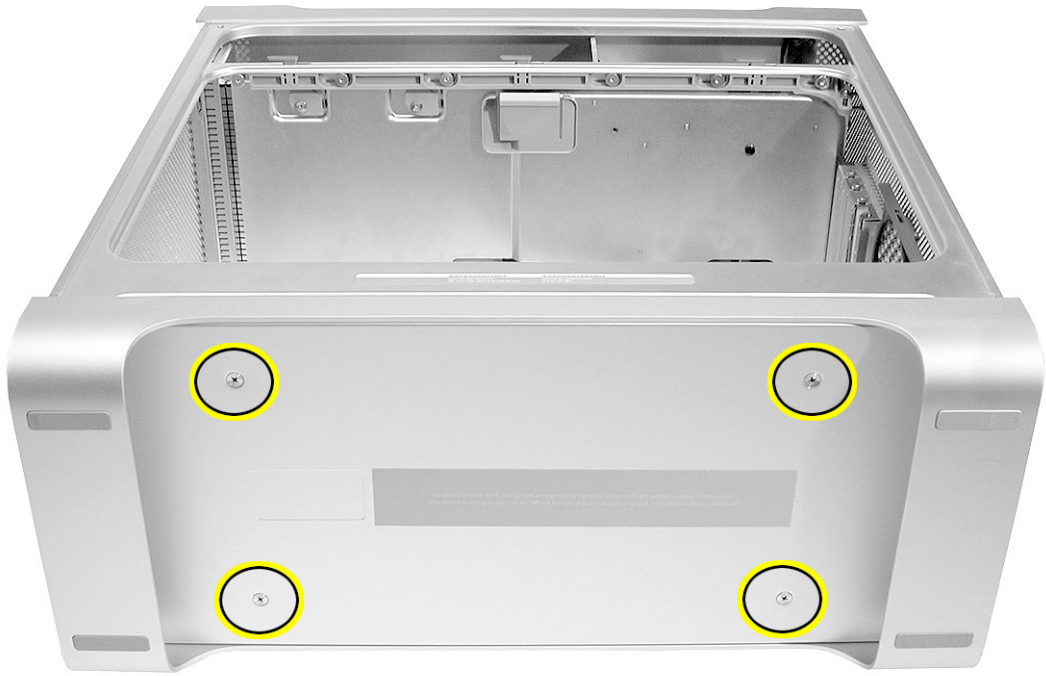
Procedure

1. Remove the two screws that secure the power supply top cover, and remove the cover from the enclosure.

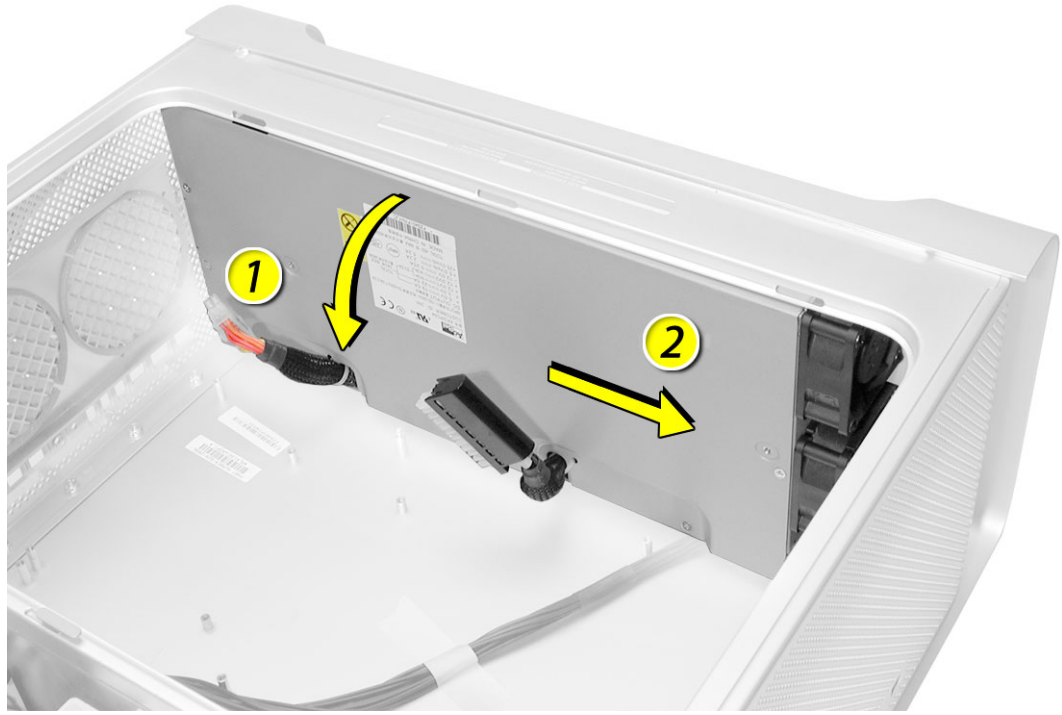
   Warning: Whenever the power supply cover is removed, be very careful not to drop any screws into the power supply. Doing so could short out the unit.



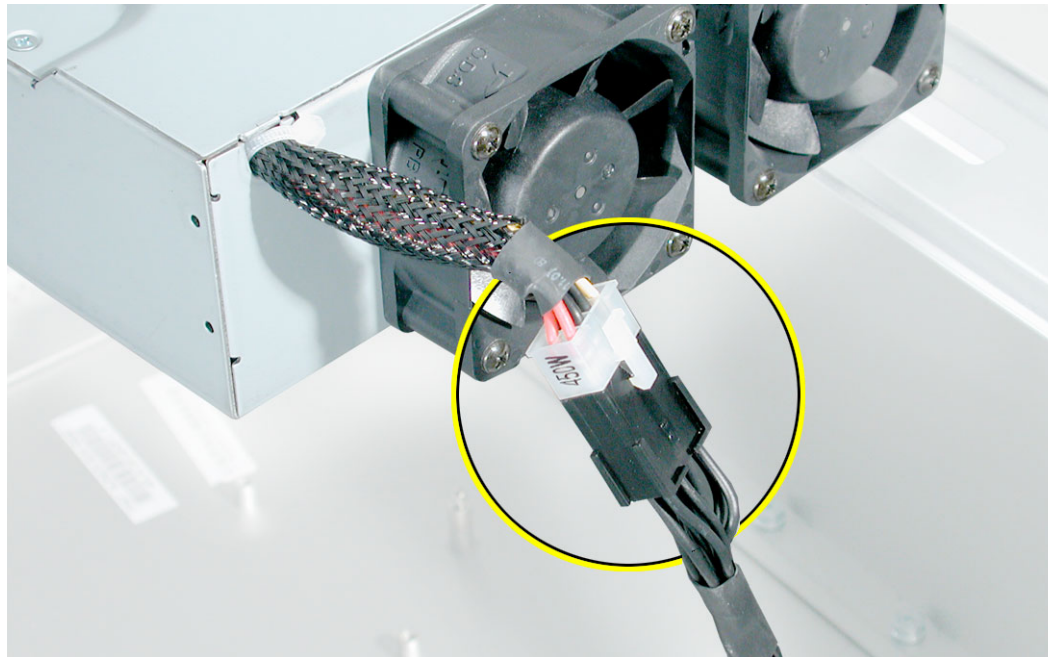
Remove the four power supply mounting screws on the bottom of the enclosure.



2. Push in on the power receptacle, and slide the power supply toward the front of the computer.
3. Tilt the power supply a short distance out of the bottom of the enclosure.

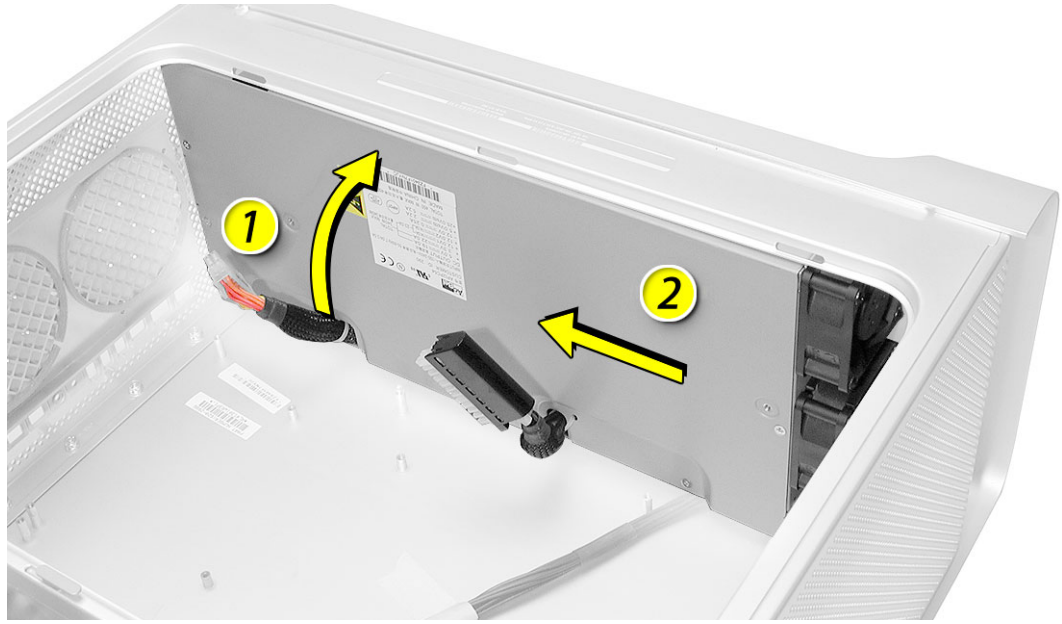


4. Disconnect the power harness cable from the power supply.



5. Remove the power supply from the enclosure.

Replacement Note: After reconnecting the power supply to the power harness cable, slightly lift the cable so that it does not become wedged under the power supply, and lower the power supply into the enclosure. Rotate the power supply back flush with the enclosure bottom until it snaps into place. Then slide the power supply toward the back of the computer, making sure the power receptacle aligns with the opening in the back panel.



Air Deflector Sensor Board

Tools

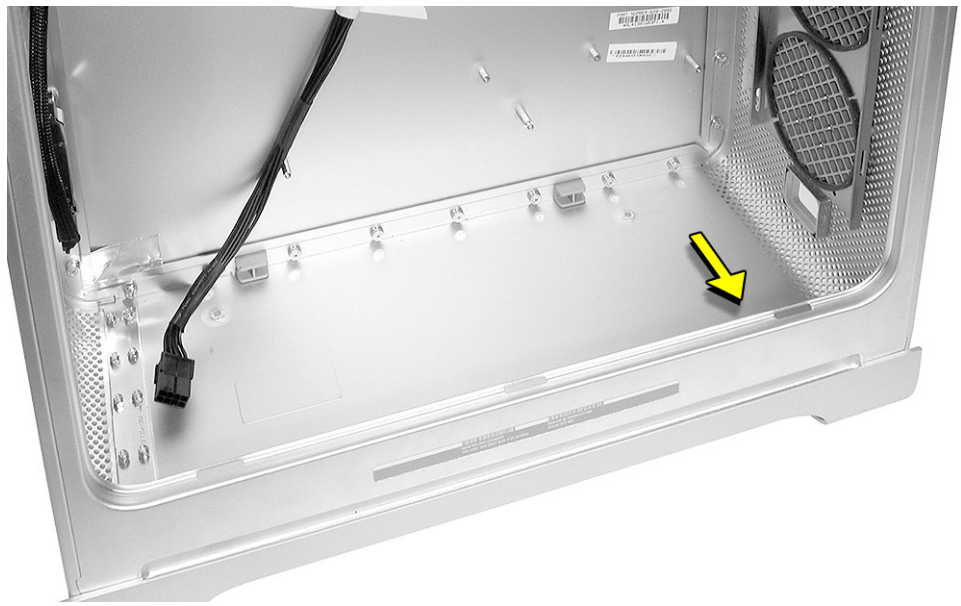
The only tool required for this procedure is a flat-blade screwdriver. A small mirror to use in locating the board is optional.

Preliminary Steps

Before you begin, open the computer, lay it on its side with the access side facing up, and remove the following:

- All AGP and PCI cards
- Airport Extreme Card (if installed)
- PCI card guide
- Speaker/fan assembly
- Heatsink cover
- Processor inlet frame
- Rear exhaust fan assembly
- PCI divider
- Logic board
- Power supply

Part Location

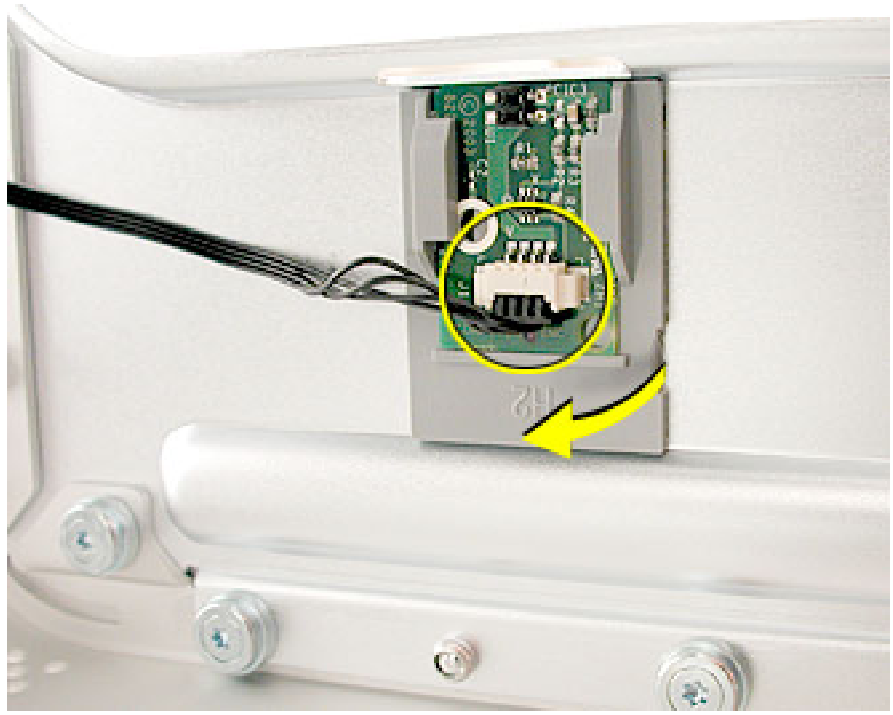


Procedure

The air deflector sensor board is located inside the enclosure on the bottom right front corner of the frame. You may find a small mirror useful in locating the board.

1. Disconnect the sensor cable from the air deflector sensor board.
2. Using a flat-blade screwdriver, pry up the sensor board from the frame and remove the board from the enclosure.

   Note: Adhesive on the back of the board attaches the sensor board to the frame.



Service Source

Troubleshooting

Power Mac G5 (Late 2004)

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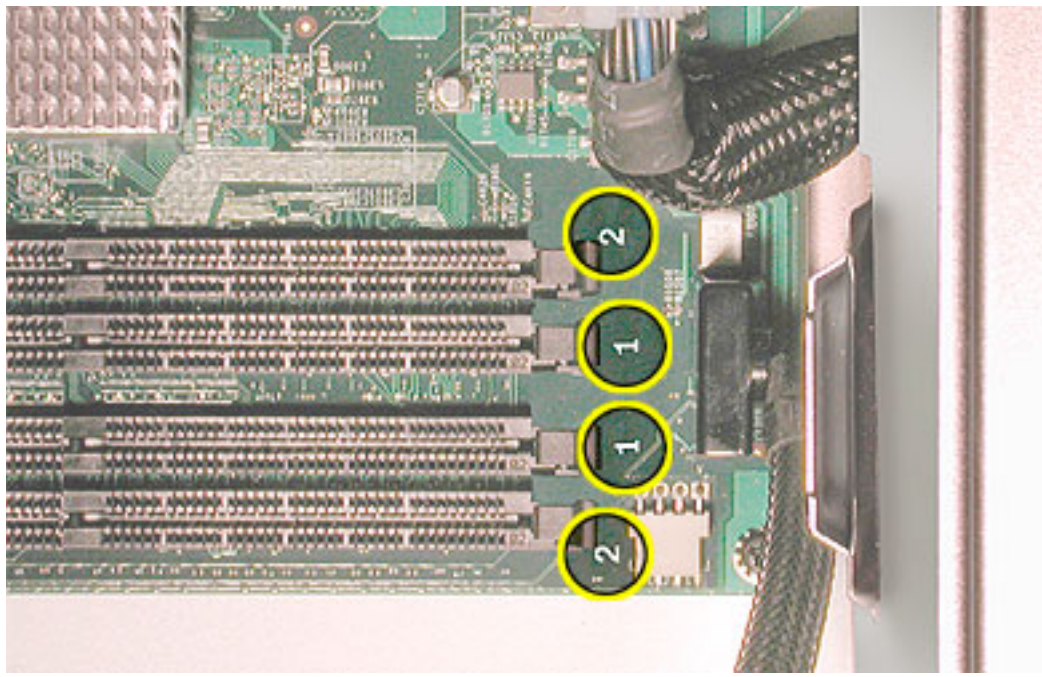
General Information

DDR Memory

In the Power Mac G5, PC3200/400 DDR-SDRAM DIMMs must be installed in pairs of equal size and speed. Memory from older Macintosh computers is not compatible. Do not try to install non-DDR memory as it will not fit in the DIMM slots and could cause damage.

The computers ship with a minimum of 256 MB of RAM, provided by a pair of 128 MB DIMMs installed in the two DIMM slots marked “1.” You can add DIMMs, provided they are installed as a pair of equal size, in the two DIMM slots marked “2.” A diagram on the logic board near the DIMM slots illustrates how the pairs must be installed.



Results of Mixing PC2100, PC2700, and PC3200 RAM

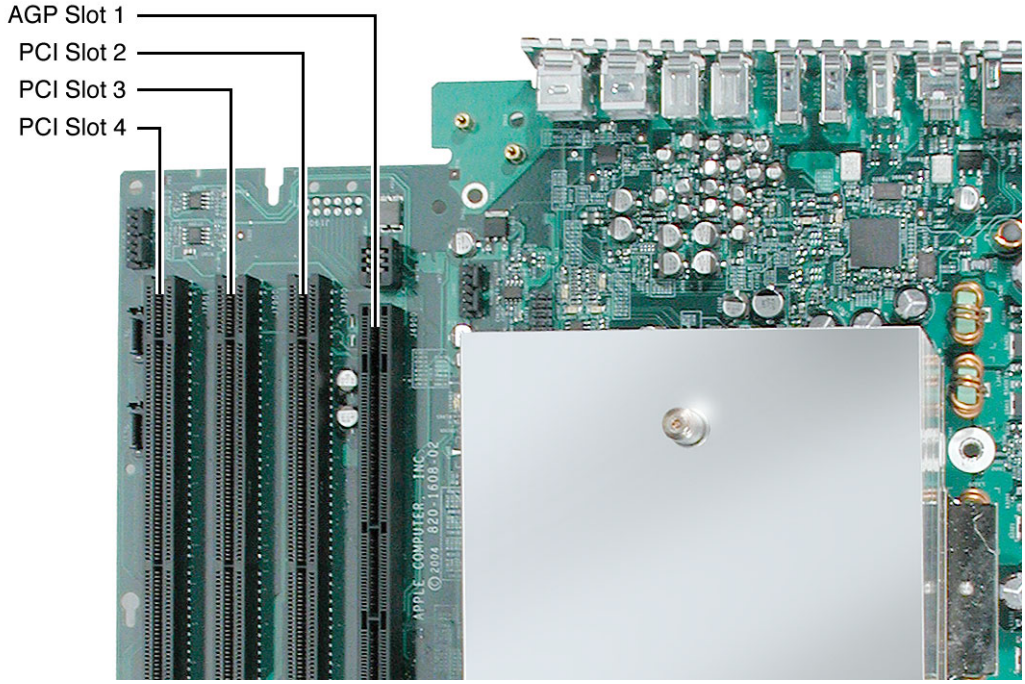
The table below describes what happens if you install PC2100, PC2700, or PC3200 memory in the Power Mac G5 computer.

When only PC2100 DIMMs are installed	The computer makes three single tones instead of the startup sound. The LED on the front of the computer flashes three times, and the computer does not startup.
When a mix of PC2100, PC2700, or PC 3200 DIMMs is installed	The computer starts up normally, but neither the computer nor Apple System Profiler recognizes the PC2100 memory.
When no memory is installed or memory is not installed correctly	The computer does not make a normal startup sound. Instead, there is a single tone, and the computer's front LED flashes about once every 5 seconds.

PCI and AGP Cards

Power Mac G5 computers have four expansion card slots, three of which accommodate Peripheral Component Interconnect (PCI) cards and one that accepts an advanced graphics port (AGP) video card. AGP cards and PCI cards have different connectors, so you cannot insert a PCI card into the AGP slot.

Note: Maximum power consumption for all four expansion slots (the three PCI expansion cards and the AGP card) should not exceed 90 watts (W).



AGP Cards

The AGP video card, installed in slot 1, contains the graphics processor unit (GPU) and provides the computer's display ports. Slot 1 is designed specifically to accept AGP cards.

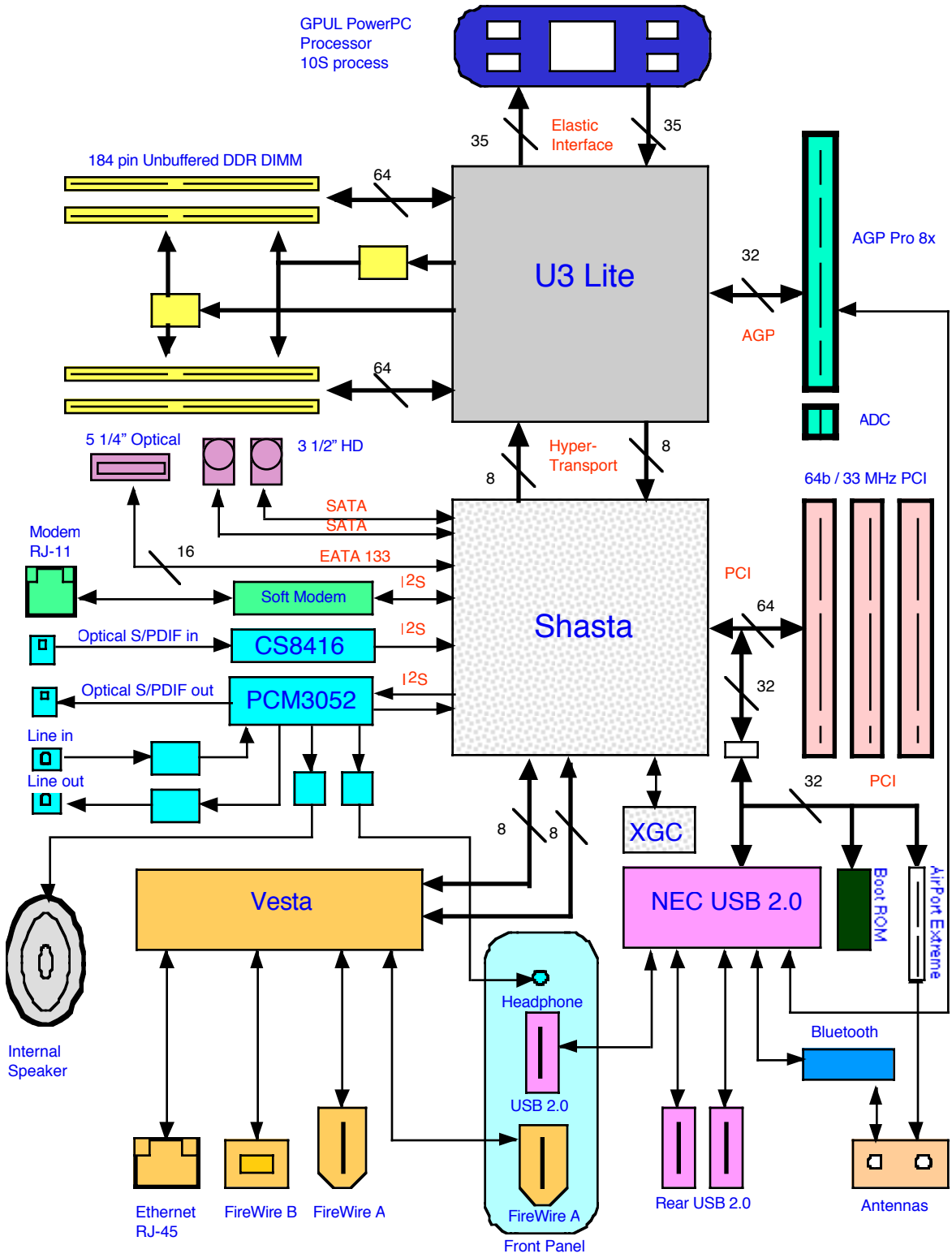
Note: Certain high-performance AGP graphics cards, when installed in slot 1, block access to the adjacent PCI slot. In this case, PCI cards can be installed in slots 3 and 4 but not in slot 2.

PCI Cards

The remaining three expansion slots, labeled 2, 3, and 4, accommodate PCI cards up to 12 inches long. The PCI slots can accommodate mixed-voltage (5.0 V, 12 V, or 3.3 V) cards but only at 3.3 V signaling, with 32-bit or 64-bit data widths and a 33 MHz frequency. You can add a 66 MHz card to a 33 MHz PCI slot if the card can operate at the lower 33 MHz rate.

Warning: Installing PCI cards that function only at 66 MHz could damage the computer. However, cards that run at both 66 MHz and 33 MHz may be installed. Check with the card's manufacturer to see if a 66 MHz card also works at 33 MHz.

Block Diagram



Resetting the Logic Board

Many system problems can be resolved by resetting the logic board. Because the Power Mac G5 (Late 2004) uses a System Management Unit (SMU) controller chip rather than a Power Management Unit (PMU) controller chip, the logic board does not include a reset button. Instead, to reset the logic board, do the following:

1. Shut down the computer.
2. Unplug the computer from its power source.
3. Wait 15 seconds.
4. Plug the power cord back in, and turn the computer on. If the computer does not power on, there is something else wrong with it; refer to the “Startup Failures” section of “Symptom Charts” in this chapter.

Note: The above procedure resets the computer’s PRAM. After resetting the logic board, be sure to reset the time, date, and other system parameter settings.

RAM and Processor Verification: Power-On Self Test

A power-on self test in the computer’s ROM automatically runs whenever the computer is started up after being fully shut down (the test does not run if the computer is only restarted). If the test detects a problem, the status LED located above the power button on the front of the computer will flash in the following ways*:

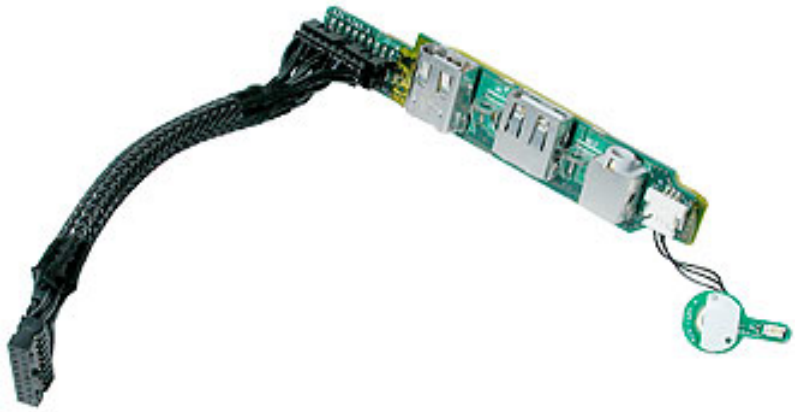
- **1 Flash:** No RAM is installed or detected.
- **2 Flashes:** Incompatible RAM types are installed.
- **3 Flashes:** No RAM banks passed memory testing.
- **4 Flashes:** No good boot images are detected in the boot ROM (and/or there is a bad sys config block).
- **5 Flashes:** The processor is not usable.

*** Note:** The status LED lights up when the power button is depressed at startup. Do not count this light as one of the diagnostic flashes.

Front Panel Board Troubleshooting

Certain no power symptoms can sometimes be caused by a failed front panel board or power button. However, troubleshooting these parts by swapping them out with known-good parts can be time-consuming. An alternative approach is to build a simple front panel board troubleshooting tool, as illustrated, and then use the procedures described below to test the board and button before actually replacing them.

The tool consists of a known-good front panel board, with a known-good power button and front panel board cable attached.



To use the tool in troubleshooting the front panel board and power button, do the following:

1. Shut down the computer.
2. Disconnect the installed front panel board cable from the logic board.
3. Connect the front panel board cable from the troubleshooting tool to the logic board.
4. Try to start up the computer by pressing the power button on the troubleshooting tool.

Then proceed with the front panel board troubleshooting steps as described in the “Symptom Charts” in this chapter.

Power Supply Verification

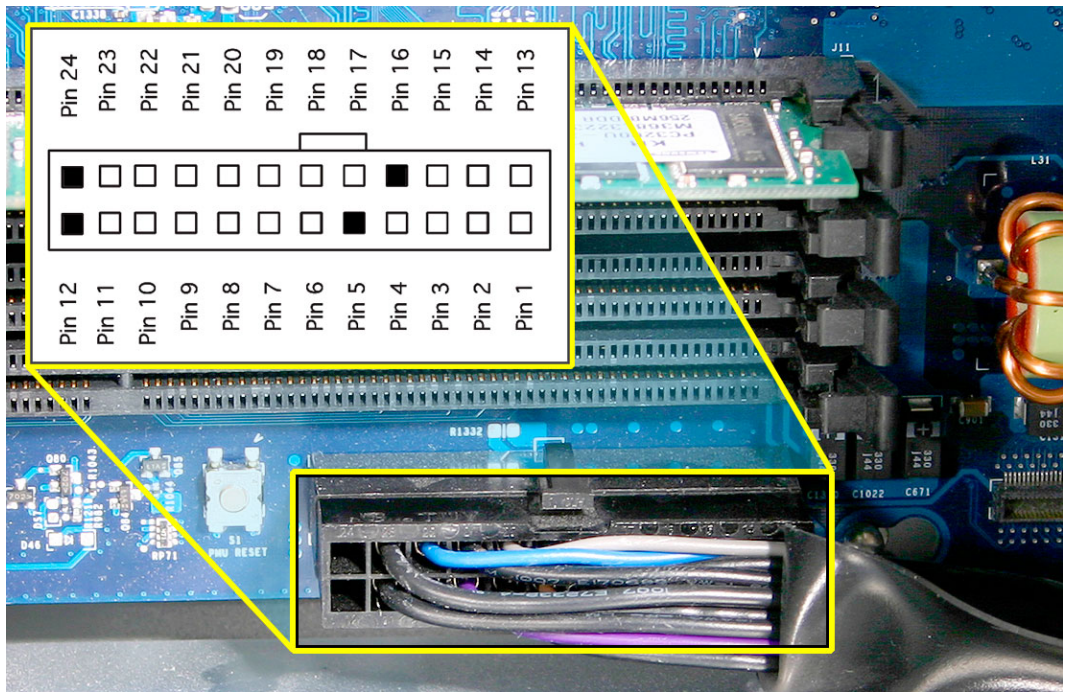
To power on, the computer's logic board requires a “trickle” power of +5V. If the system fails to power on, first reset the PMU. Then follow the procedure outlined below to determine whether the problem is related to the power supply.

Note: To verify the power supply, you need a volt meter.

1. Remove the power cord from the computer.
2. Open the computer, lay it on its side with the access side facing up.
3. Remove the front inlet fan assembly.

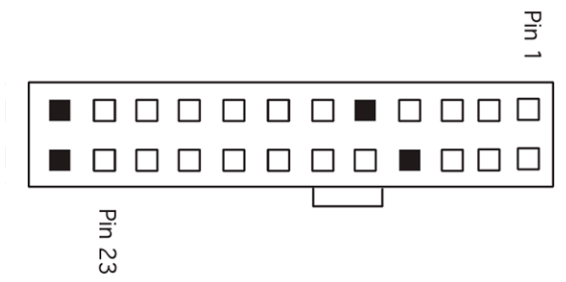
4. Remove the black plastic cap covering the 24-pin power supply cable connector (the P1 or largest connector). The cap fits tightly over the connector. To remove it, rock the cap gently forward and backward as you lift up.

Note: This is a top view of the connector when it is plugged into the logic board



5. Press the release latch on the power supply connector and disconnect the cable from the logic board.
6. Plug a known good power cord into the computer. Do not turn on the computer.
7. On the power supply cable connector: connect the black lead of the volt meter to pin 23 and connect the red lead of the volt meter to pin 1.

Note: This is a bottom view of the connector when it is unplugged and facing up.



The volt meter should measure approximately +5V. If you do not get a reading of +5V, recheck the volt meter connections and measure the voltage again. If the voltage is still not present, replace the power supply.

Symptom Charts

How to Use the Symptom Charts

The Symptom Charts included in this chapter will help you diagnose specific symptoms related to the product. Because cures are listed on the charts in the order of most likely solution, try the cures in the order presented. Verify whether or not the product continues to exhibit the symptom. If the symptom persists, try the next cure.

Note: If a cure instructs you to replace a module, reinstall the original module before you proceed to the next cure.

Important: The only way to shut off power completely to the computer and display is to disconnect their power plugs from the power source. Make sure the power cords to the computer and display are within easy reach.

Startup Failures

When testing a computer for the following symptoms, remove the side access panel so you can better observe or listen for fan movement.

Note: For more information on startup failures related to mixing incorrect versions of DIMMs, see the chart on page 2 of this chapter.

Power-on LED does not illuminate when power button is pressed, fans do not spin, and there is no boot tone or video

1. Verify power outlet is good
2. Replace power cord
3. Reset the logic board. Refer to “Resetting the Logic Board” in this chapter.
4. Verify power supply cables are fully connected
5. Check for trickle voltage on the power supply connector. Refer to “Power Supply Verification” in this chapter. If verification fails, replace power supply.
6. Reseat front panel board cable
7. Replace front panel board cable
8. Test the front panel board and power button using the front panel board troubleshooting tool. Refer to “Front Panel Board Troubleshooting” in this chapter. If the computer starts up correctly, go to step 9. Otherwise, go to step 12.

9. Test whether the front panel board or power button is at fault. Remove the installed front panel board and swap it for the known-good front panel board in the front panel board troubleshooting tool. Then connect the troubleshooting tool to the logic board of a known-good Power Mac G5 and start it up using the tool. If the computer does not start up correctly, go to step 10. Otherwise, go to step 11.
10. Replace front panel board
11. Replace power button
12. Replace logic board

Power-on LED illuminates when power button is pressed but fans do not spin (or spin only momentarily) and there is no boot tone or video

1. Reseat video card. (Make sure video card is fully inserted in connector and end of card is secured by the connector latch.)
2. Reset the logic board. Refer to “Resetting the Logic Board” in this chapter.
3. Verify power supply cables are fully connected
4. Check for trickle voltage on the power supply connector. Refer to “Power Supply Verification” in this chapter. If verification fails, replace power supply.
5. Replace logic board

Power-on LED illuminates when power button is pressed and fans spin continuously but there is no boot tone or video

1. Reseat video card. (Make sure video card is fully inserted in connector and end of card is secured by the connector latch.)
2. Verify speaker cable is fully seated.
3. Reset the logic board. Refer to “Resetting the Logic Board” in this chapter.
4. Replace logic board

Power-on LED illuminates when power button is pressed, fans spin, and boot tone chimes, but there is no video

1. Reseat video card. (Make sure video card is fully inserted in connector and end of card is secured by the connector latch.)
2. Reset PRAM (restart computer while holding down Control-Option-P-R keys until second boot tone chimes)
3. Replace video card
4. Reset the logic board. Refer to “Resetting the Logic Board” in this chapter.
5. Replace logic board

Power-on LED does not illuminate when power button is pressed, but fans spin, boot tone chimes, and there is video

1. Reseat front panel board cable
2. Replace front panel board cable
3. Test the front panel board and power button using the front panel board troubleshooting tool. Refer to “Front Panel Board Troubleshooting” in this chapter. If the computer starts up correctly, go to step 4. Otherwise, go to step 7.
4. Test whether the front panel board or power button is at fault. Remove the installed front panel board and swap it for the known-good front panel board in the front panel board troubleshooting tool. Then connect the troubleshooting tool to the logic board of a known-good Power Mac G5 and start it up using the tool. If the computer does not start up correctly, go to step 5. Otherwise, go to step 6.
5. Replace front panel board
6. Replace power button
7. Replace logic board

Other Failures

Air deflector sensor board

1. Reseat air deflector sensor board cable
2. Replace air deflector sensor board
3. Replace logic board
4. Replace enclosure

Hard drive (kernel panics, hard drive does not mount, or performance slows when second hard drive is installed)

1. Replace hard drive guide screws
2. Replace hard drive

Optical drive

1. Replace optical drive cable
2. Replace optical drive
3. Replace logic board

FireWire port (front panel A)

1. Reseat front panel board cable
2. Replace front panel board cable

3. Replace front panel board
4. Replace logic board

Firewire port (rear A<->B)

Replace logic board

Firewire port (rear B<->B)

Replace logic board

Internal speakers (left or right fails, boot tone)

Replace logic board

Internal speakers (high-pitch tone)

1. Replace power supply
2. Replace logic board

USB 2.0 (front port)

1. Replace front panel board cable
2. Replace front panel board
3. Replace logic board

USB 2.0 (rear-top port or rear bottom port)

Replace logic board

Modem

1. Replace modem
2. Replace modem filter board
3. Replace logic board

AirPort

1. Replace AirPort Extreme Card
2. Replace antenna card
3. Replace logic board

Bluetooth

1. Replace Bluetooth card

2. Replace antenna card
3. Replace logic board

Audio IO (front line in <-> headphones)

1. Replace front panel board cable
2. Replace front panel board
3. Reposition logic board
4. Replace logic board

Audio IO (rear line in <-> line out)

Replace logic board

Audio IO (rear line out <-> line out)

Replace logic board

Fans

Individual fan failure

1. Replace fan

   Exception: The drive fan located between the optical and hard drives cannot be replaced. You must replace the enclosure for this part.

2. Replace logic board

Media bay fan runs at high speed

Note: If any of the following three conditions cannot be verified, the red LED on the logic board near the front panel board will be lit.

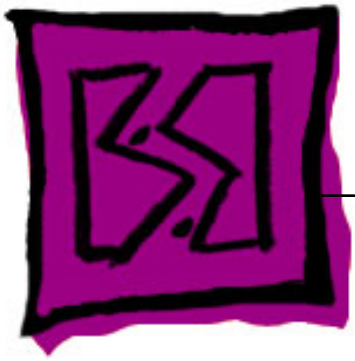
1. Verify that the clear plastic air deflector door is in place.
2. Verify that the white sensor label is not damaged and is in place on the lower right tab of the air deflector door.
3. Verify that the air deflector sensor board is operating properly.

   Note: You can differentiate a bad sensor label from a bad sensor board by doing the following: Remove the air deflector door. Slide a folded piece of paper through the slot in the enclosure where the right tab of the air deflector would normally be inserted. If the red LED goes out (but stays on with the door in place), the sensor label on the door is missing or damaged.

4. Check the sensor board cable connection on the logic board (second from right connector located directly below the hard drives).

5. Replace the logic board.
6. Replace the air deflector sensor board.

Service Source



Views

Power Mac G5 (Late 2004)

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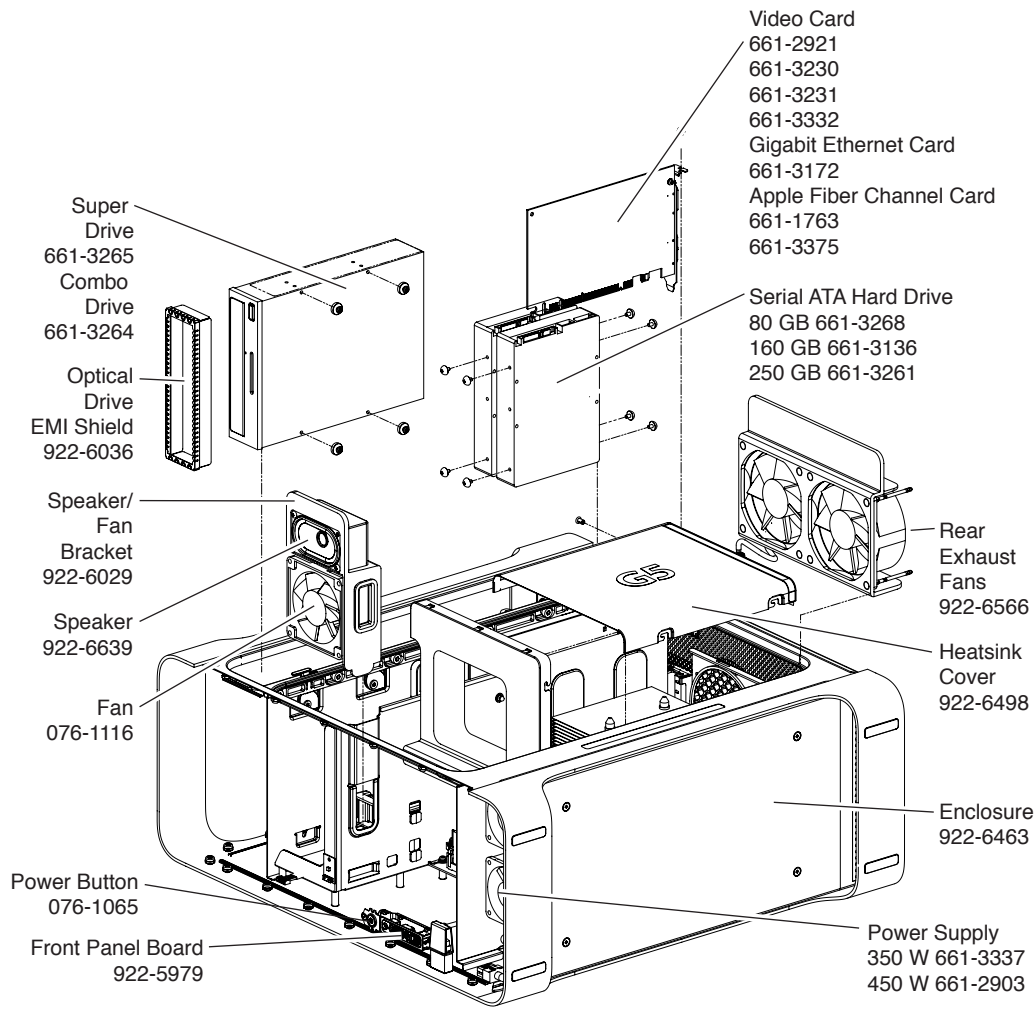
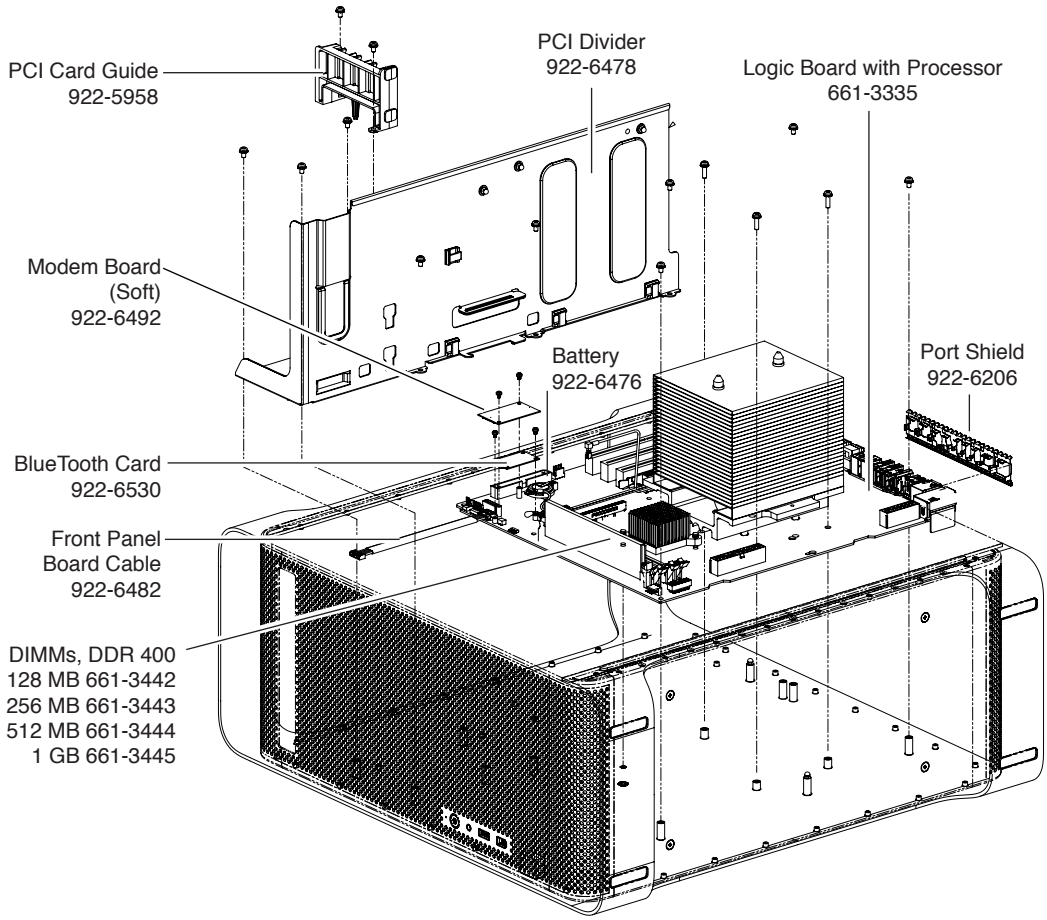
Exploded Views

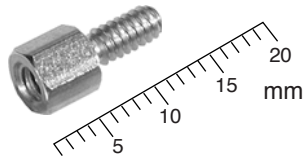
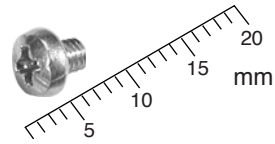
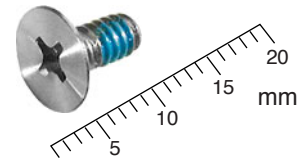
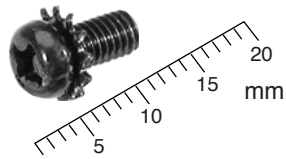
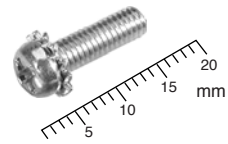
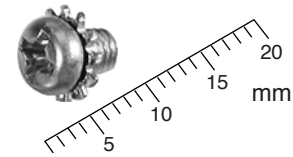
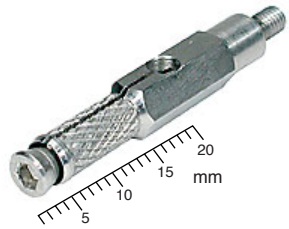
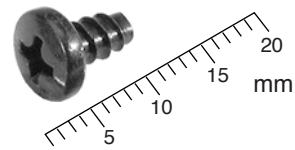
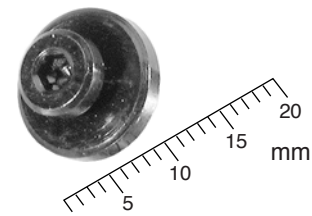
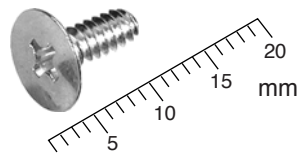
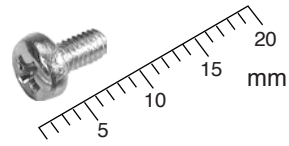
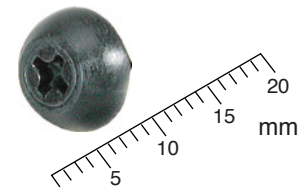
Exploded View 1



Exploded View #2

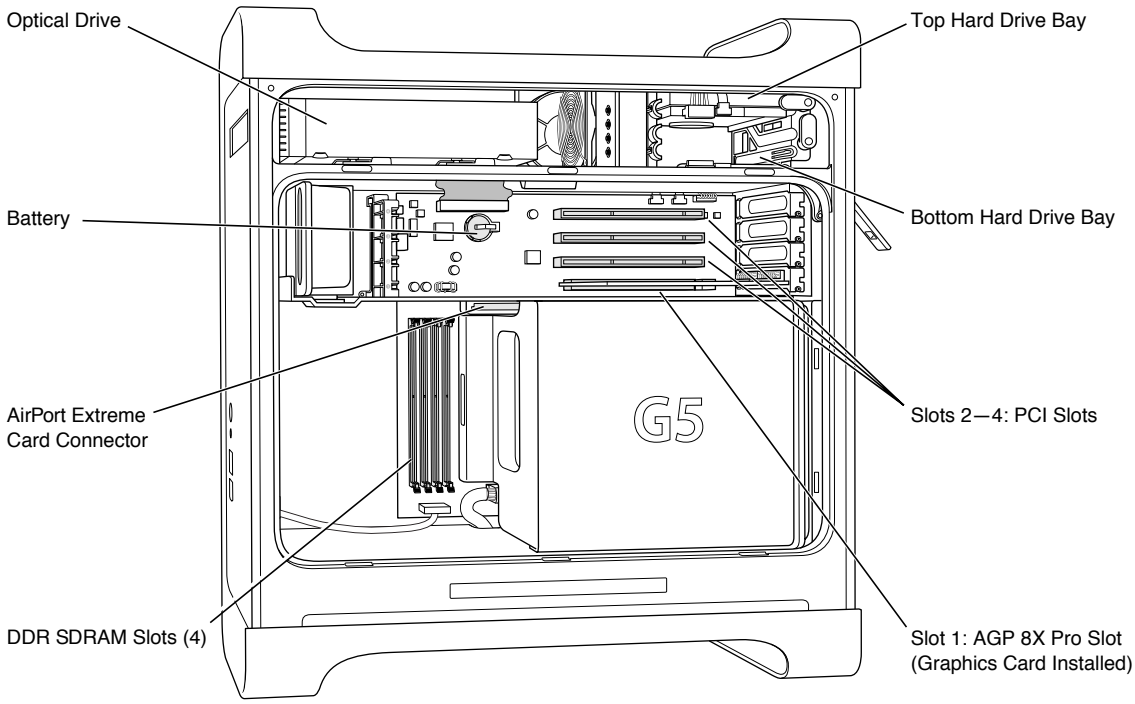


Screw Matrix

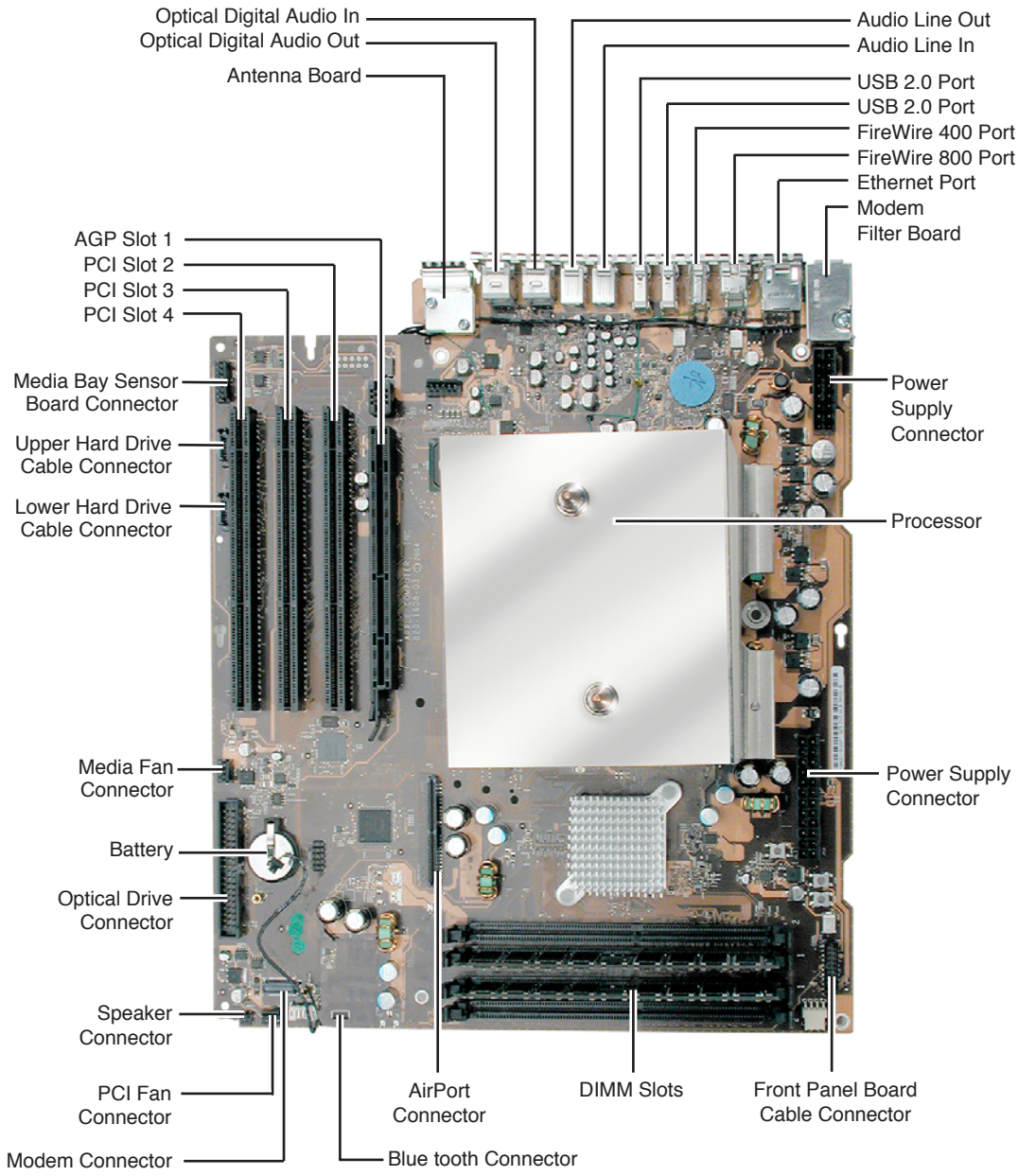
922-4332  Video card port bracket	**922-5846**  Modem, Bluetooth card, front panel board	**922-5972**  Power supply bottom case
922-5974  Logic board, PCI divider	**922-6027**  Logic Board	**922-6024**  PCI fence, AGP/PCI cards
922-6479  Logic Board	**922-6035**  Speaker	**922-6305**  Optical drive
922-6169  Power supply top cover	**922-6252**  Modem plug, antenna brd.	**922-6253**  Hard drive

Internal Views

Overview

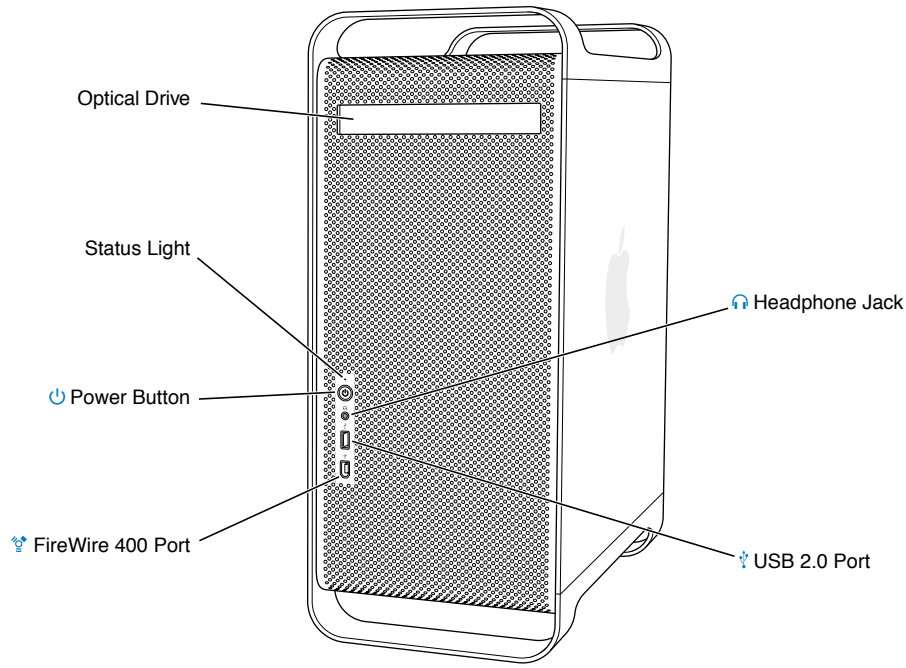


Logic Board

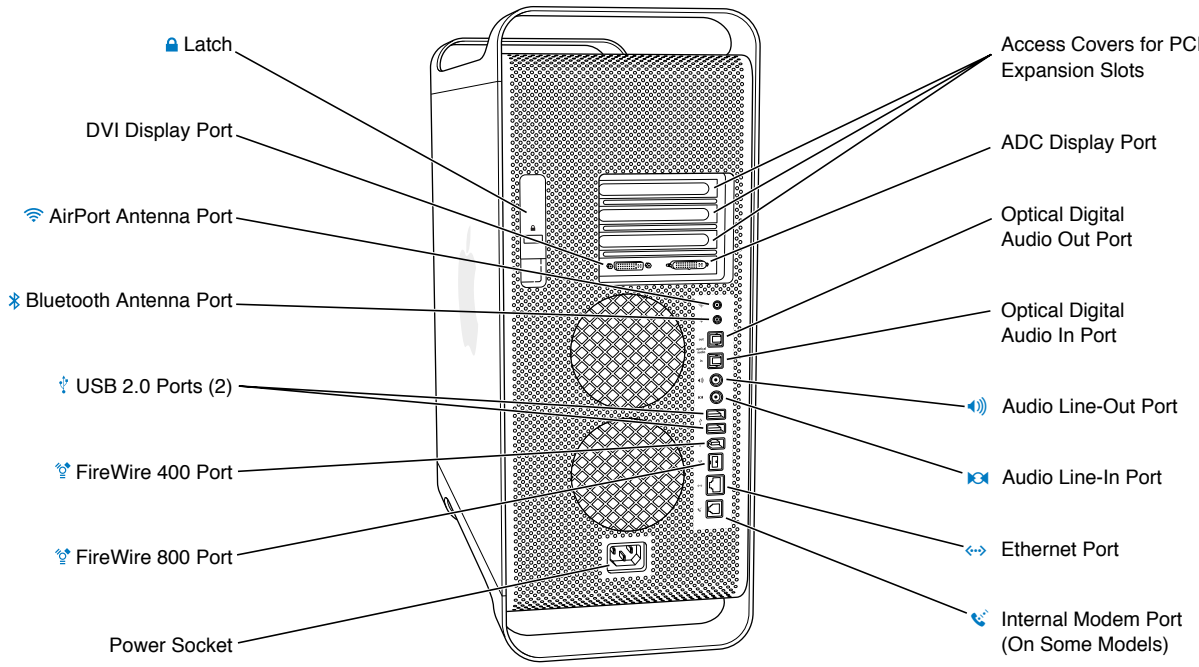

Optical Digital Audio In
Optical Digital Audio Out
Antenna Board
Audio Line Out
Audio Line In
USB 2.0 Port
USB 2.0 Port
FireWire 400 Port
FireWire 800 Port
Ethernet Port
Modem
Filter Board
AGP Slot 1
PCI Slot 2
PCI Slot 3
PCI Slot 4
Media Bay Sensor
Board Connector
Upper Hard Drive
Cable Connector
Lower Hard Drive
Cable Connector
Power
Supply
Connector
Processor
Media Fan
Connector
Battery
Optical Drive
Connector
Power Supply
Connector
Speaker
Connector
PCI Fan
Connector
Modem Connector
AirPort
Connector
Blue tooth Connector
DIMM Slots
Front Panel Board
Cable Connector

External Views

Front View



Rear View


Latch
DVI Display Port
AirPort Antenna Port
Bluetooth Antenna Port
USB 2.0 Ports (2)
FireWire 400 Port
FireWire 800 Port
Power Socket
Access Covers for PCI Expansion Slots
ADC Display Port
Optical Digital Audio Out Port
Optical Digital Audio In Port
Audio Line-Out Port
Audio Line-In Port
Ethernet Port
Internal Modem Port (On Some Models)